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April, 1943 35 Cents Vol. 36, No. 4

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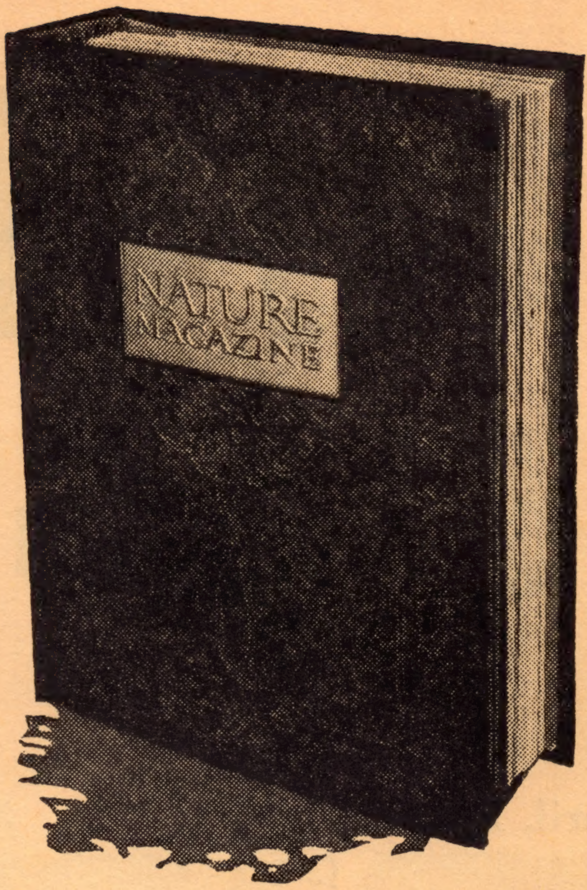

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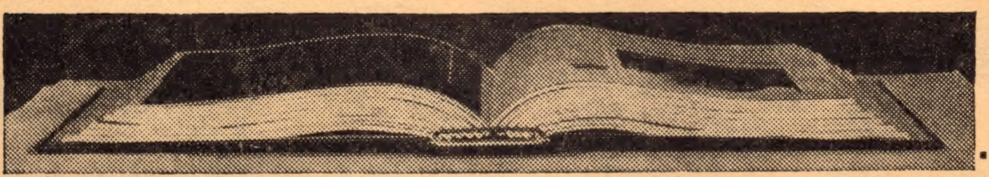

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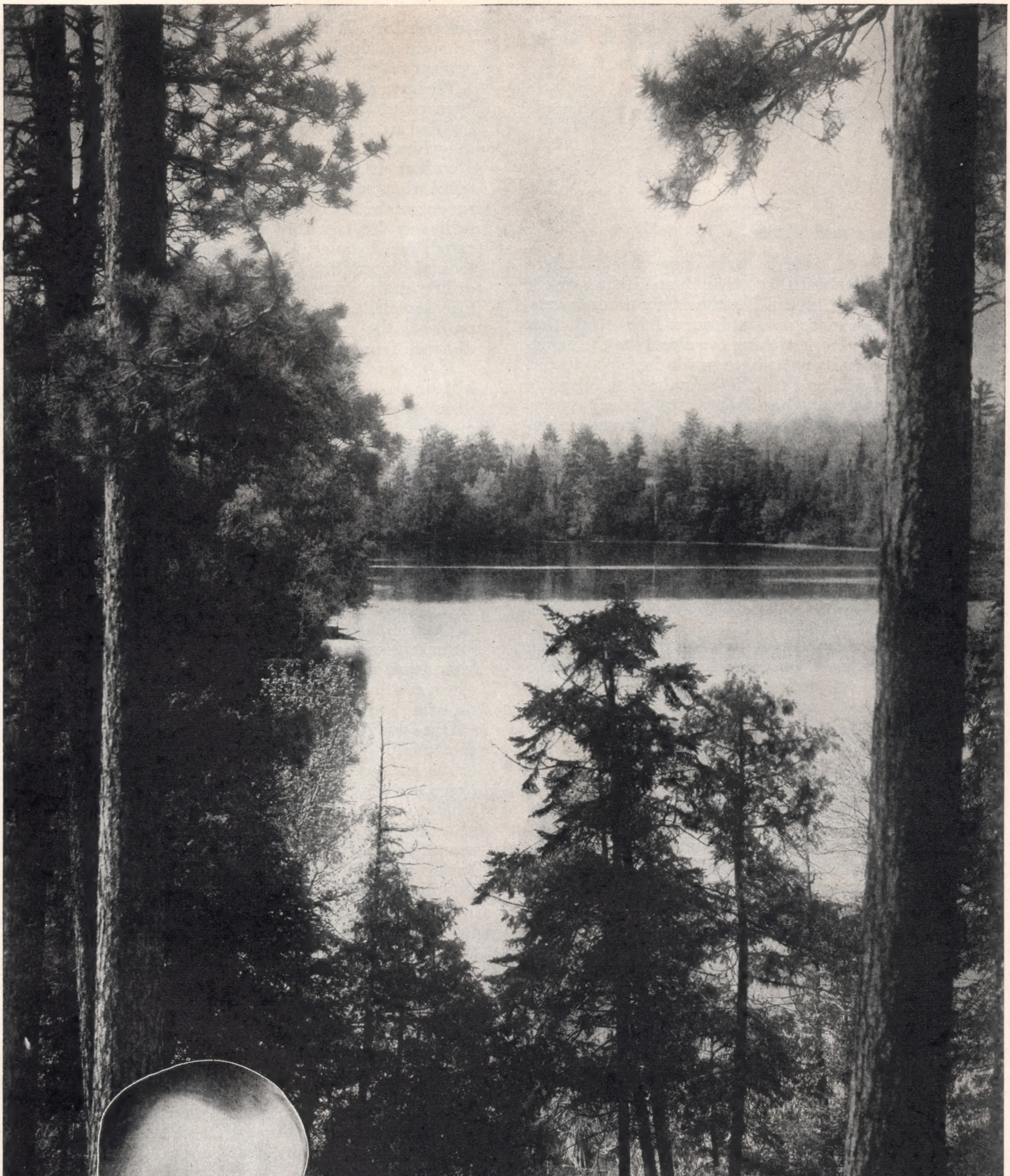

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Camera Trails

By NORRIS W. HARKNESS

Problems Here and There

FROM time to time in preparing these Camera Trail wanderings I have wondered if there were not too much of the Northeast in the subjects, especially in the more seasonal ones. I have felt that much of the time I was sticking too closely to the calendar as it appears in Nature photographic subjects in and around New York, and the New England to Virginia area that I know better than I do the rest of the country.

But on an extended trip on a quite different assignment that takes me into a number of Western states, I am delighted to find that, in answer to my questions of Nature photographers in various areas, the problems are similar everywhere. As one camera user in Utah put it, "The camera doesn't care about state lines, and while the questions of filters and exposure change somewhat in different parts of the country, a good picture in one place is good everywhere, and films, shutter speeds and cameras are the same wherever we take them."

The complete agreement on this point has been most reassuring, and perhaps all that is required to make Camera Trails timely is to read the right issue in the right month, no matter when it appeared. At least, I hope that is the case.

In talking with a California photographer who has found his greatest satisfaction in pictures in the deserts of his own state and in Nevada, we got on the subject of filters. This led us to a discussion of the quality of the light found in high country and along the coast. It started from a camera club argument on what filters do, and why their factors vary with different films—a subject we have talked about here several times before. Before we were through, we had gone into the reasons for the difference in behavior of the same filter at different altitudes.

At sea level a medium yellow filter that has a factor of two with panchromatic film, and three or more with the orthochromatics like Plenachrome and Verichrome (the difference in the factors, as you remember, is because of the lack of red sensitivity in the ortho films), gives an effect that most nearly approaches what the eye sees. The sky is darkened just enough to bring out white clouds against a gray that seems natural, and the medium yellow, since it brings out a correct effect, is called a "correction filter". Orange and red filters darken the sky to a tone below that which the eye sees, and therefore add greater contrast between clouds and sky. Hence they are called "contrast filters".

At higher altitudes, however, there is less dust and moisture in a thinner layer of air, and the blue light from the sky penetrates the atmosphere better, making the skies look bluer and giving everything an almost indistinguishable blue cast. In such light the same medium yellow filter, which merely corrects at sea level, has a greater effect because it still holds back the greater part of the blue light and darkens the sky almost as much as a fairly deep orange. The result is that the filter that is only corrective at sea level is actually a contrast filter high up in mountainous territory. It follows, then, that a lighter filter can be used at high altitudes to yield dramatic clouds against rather dark skies.

We have all noticed, after the vacation pictures have been printed, that the gorgeous mountain view that thrilled us when we made the exposure is disappointing when we make even a good print of it. It lacks the grandeur of the original, and the miles of hazy distance that tapered off into the far-away mountain range are shrunk to a shallow insignificance. The trouble lies in the fact that we have nothing by which to gauge the distance. Hills at a mile or two might well look as big and imposing as mighty mountains twenty or fifty miles away unless we have included in the picture something the size of which is known, or some path for the eye to travel that will demonstrate the distance from one object to another.

If we can find a viewpoint that will include a nearby hill or tree, and then show others in a diminishing series that runs back into the distance, we will hold more of the magnitude of the subject, but such viewpoints are rare and hard to reach. The haze that covers extremely distant objects can also be used to make them seem farther away in the photograph, but here again we encounter a difficulty. The same filter that brings out the clouds cuts through that haze and reduces it to no value in emphasizing depth. With no clouds in the scene, we can make the shot without a filter and print in the clouds later in the darkroom, or we can depend upon the great blueness of the sky to suggest the clouds with no filter over the lens. The latter alternative requires rather short exposures to keep from over-exposing the sky area, but if the nearer areas are fairly brightly lighted, there will usually be no trouble on this score.

One dodge that desert photographers sometimes use to add depth in pictures of wide expanses of sage or monotonously even country is to wait for a day when there are scattered clouds and to make the exposure when the ground area is broken by their shadows. The alternate patches of light and shadow break up the monotony and give the eye a path to follow into the background so that the effort of following it makes the picture seem to have far more depth.

But except for general views for the record, or to locate other, smaller scenes, we must be prepared for some degree of disappointment in any landscapes that take in too much territory. The subject matter is simply too big to be compressed into so small a space.

One thing that I have sometimes noticed in other parts of the country struck me especially in the West. Nature photographers as a rule are prone to forget to picture the more familiar things around their home territory, and they range far and wide to gather shots of the stranger Nature subjects. In Nevada and Utah, as in other states, of course, there is tumbleweed. Many have sung about it and heard about it, but most of us have never seen it. Yet it is so familiar to Nature photographers in the places where it wanders around in large quantities, that I have been unable to find any shot of it in any cameraman's file and I have not yet had time to make a few shots for myself, or to show it here.

In your own territory there are many specimens of flora or fauna that, while perhaps not as well publicized as tumbleweed, would be of real interest to those of other areas, even though you see them too often to think them worth photographing. How many of them are in your file? Next time you are wondering what subjects to look for, those same familiar plants, or whatever is unique in your state or county, may be just what you have been wanting. A complete

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CAMERA TRAILS

(Continued from page 170)

file of both negatives and prints of the Nature subjects around you is a valuable contribution that your camera can make either to you or to someone you may someday know.

The Question Corner

G. L. K., Toronto, Canada, sends four prints with the following note: "I use a box camera and try to work only when the light is bright enough for it, but these prints seem out of focus. Did I move the camera during the exposures or can you tell me what is wrong?"

ANS.—The prints are shots of two attractive youngsters, but they are too fuzzy to make an attractive picture. However, the middle ground and background are sharp, so the camera must have been still when the exposures were made. The difficulty comes from the fact that most box cameras are focused at about fifteen feet and show everything sharply from perhaps eight feet to infinity. Objects less than seven or eight feet from the camera will be out of focus. Always be sure to have the nearest object you want sharp at least eight feet away from the lens.

B. D., East Chicago, Illinois, asks: "Why are the corners of my enlargements always slightly lighter than the rest of the picture and not quite sharp? I use a wide-angle lens on the enlarger to get a bigger print without raising the enlarger too high and the machine has condensers."

ANS.—The trouble is in the lens. A wide-angle lens will work well in the camera on a negative area whose diagonal is rather greater than the focal length of the lens, but in enlarging there is a definite tendency to a falling off at the corners in both density and sharpness. A better plan will be to use a normal lens of approximately the same focal length as the normal camera lens; one whose focal length is about equal to the diagonal of the film. A longer lens is better than a short one for the purpose even though the enlarger head must be raised higher.

If you have a picture you would like to see reproduced in Camera Trails, send it in. This is your camera section of NATURE MAGAZINE and we would prefer to use your pictures. In the event that the editors feel your shot cannot be used, I will try to explain why. Please enclose return postage.

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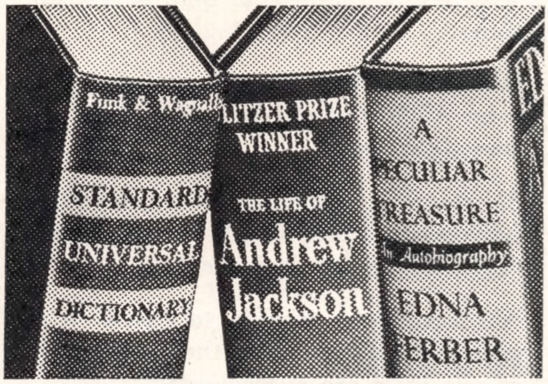

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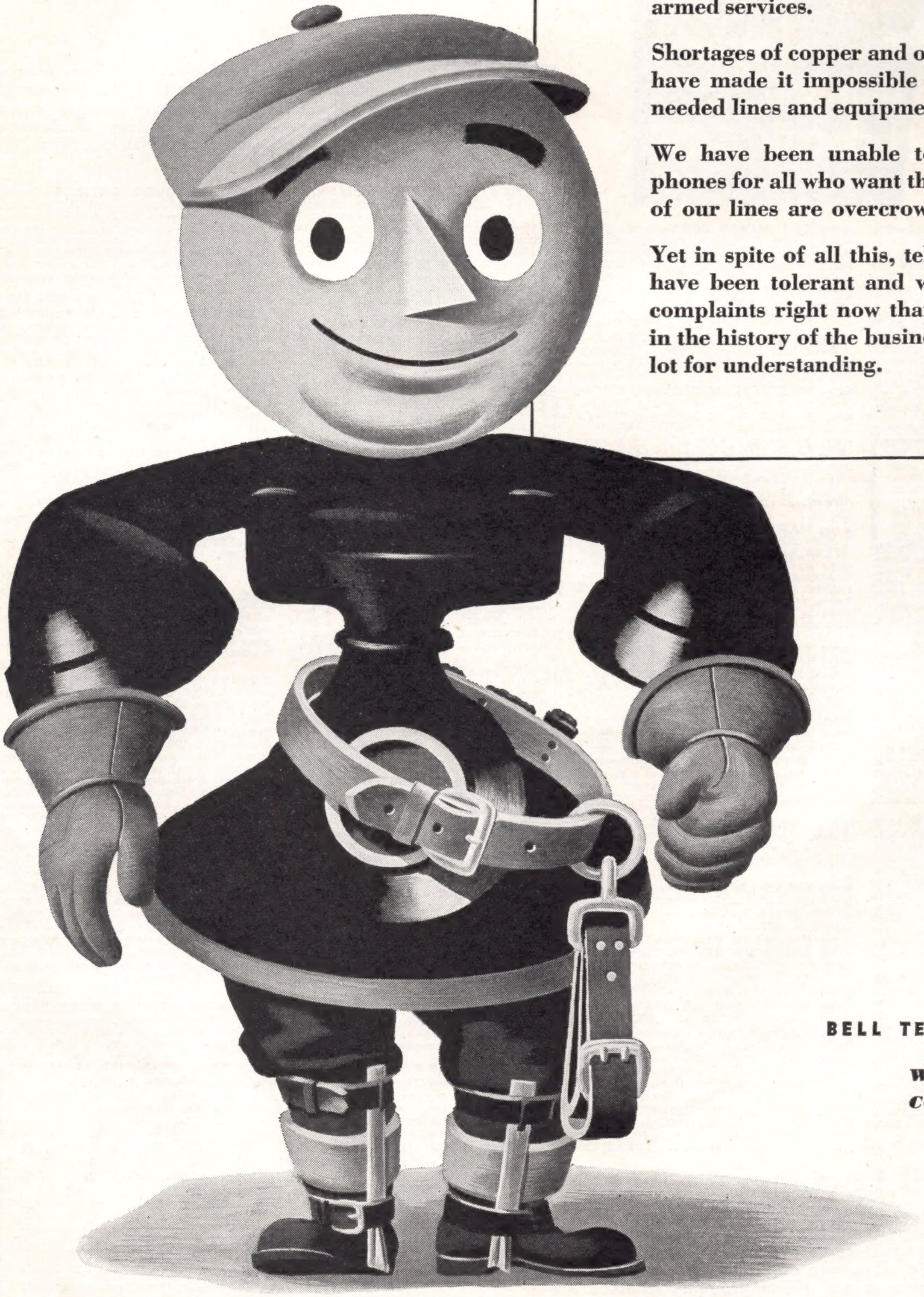
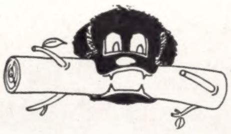


BELL TELEPHONE SYSTEM

WAR CALLS
COME FIRST

Contents Noted

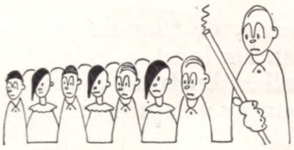
Our Patty is too old to enlist, or to be drafted for sentry or messenger duty. Yet he has already come smack up against war on the home front and is taking it like a true patriot. He eats without a protest the dry dog food that looks like coarse sawdust. We have not yet told him that FPA (not to be confused with Franklin P. Adams) has ordered limitation of animal protein content of pet foods to eight percent, and the total protein content to twenty-four percent, by dry weight. Nor have we revealed that pet-food producers have been ordered to slash production to fifty percent of their 1941 output. We are confident that he would not even permit himself a protesting growl, and would applaud the fact that pet foods supplied to the armed forces are exempt from restrictions.



Russia has asked for and gotten thousands of pounds of field and vegetable seed in lend-lease shipments. Taking minimum space in ships, it is destined to seed lands plowed by the tanks of war. Seed subscribes to no ideological ideas, but it carries within itself tremendous power in the battle for freedom.

It may be a canard, and we despise rumor-mongering, but we have heard that the first half-dozen Marine casualties, after the boys had successfully landed on Guadalcanal, came from some of them tangling with a water buffalo in the mistaken notion that it had the temperament of a barnyard bovine. We risk mentioning this—true or false—because it accents Laurence Palmer's interesting and valuable discussion in the March issue of the importance of military naturalists. Hundreds of men in our armed forces have been trained by education and experience in the flora and fauna of far parts of the world, into which the vagaries of war take them today. By their knowledge of both the menace that Nature holds, and the bounty that she offers, in a strange land, they have much to contribute to the success and relative safety of any military enterprise. In a specialized, global war the specialist in Nature should have a vital part to play.

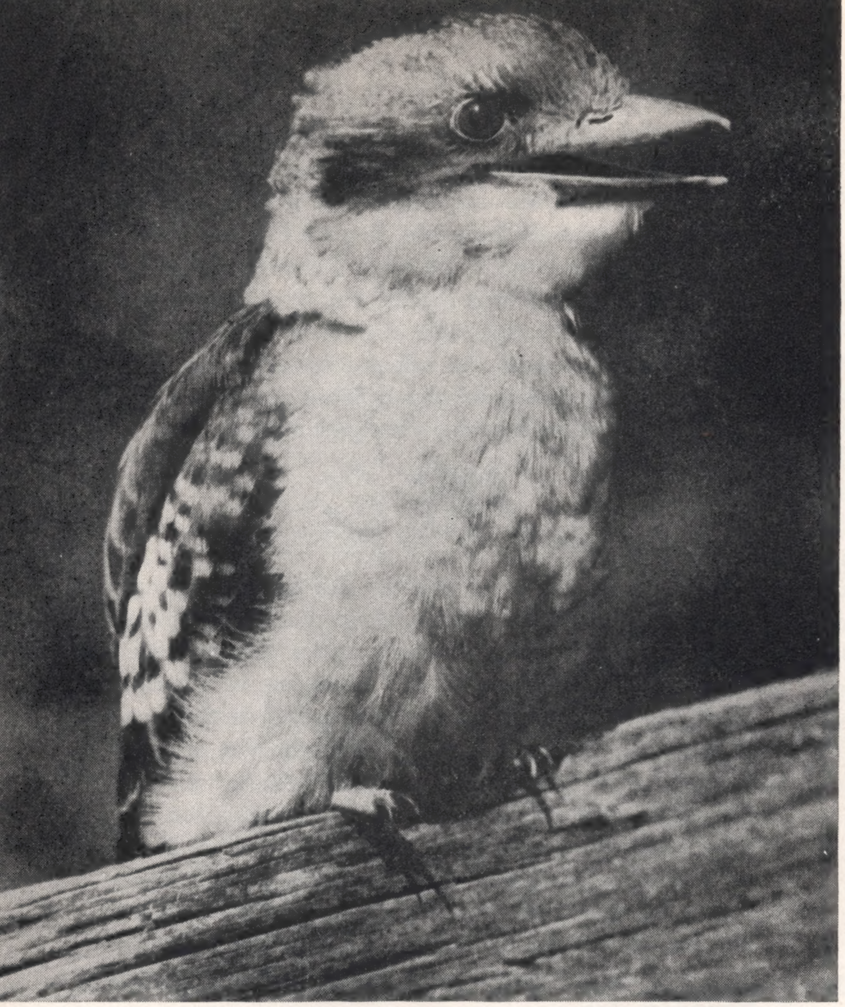
Public reactions are wondrous things, and you cannot lick a people that forms opinions, right or wrong, about anything and everything under the sun. This observation is inspired by the comments of a reader who takes us to task for the little drawing, on this page in February, of the Alabama Negro who was arrested for shooting without a license and released when it was found that he had thirty-six living children. We were accused of bad taste, and we are sorry if we offended anyone. However, in suggesting such a drawing to the artist we thought merely of the incident, not the color of the incidentee. Had the central figure been a white Alabaman we would have similarly pictured him. See . . .



In 1853, the California Academy of Sciences was founded by seven men who "picked their way over the cobblestones of one of San Francisco's two newly paved streets" to a meeting. The first president was Dr. Andrew Randall, shot three years later by a gambler, who was, however, hanged within five days. The earthquake-fire disaster of 1906 destroyed much of the work of fifty years, but relocation in Golden Gate Park enabled the Academy to expand to its present outstanding position. The story of the Academy through the rip-roaring years of its growth as a force in the promotion of science in the West is fascinatingly told by its present director, Dr. Robert C. Miller, in the *California Historical Society Quarterly*. R. W. W.

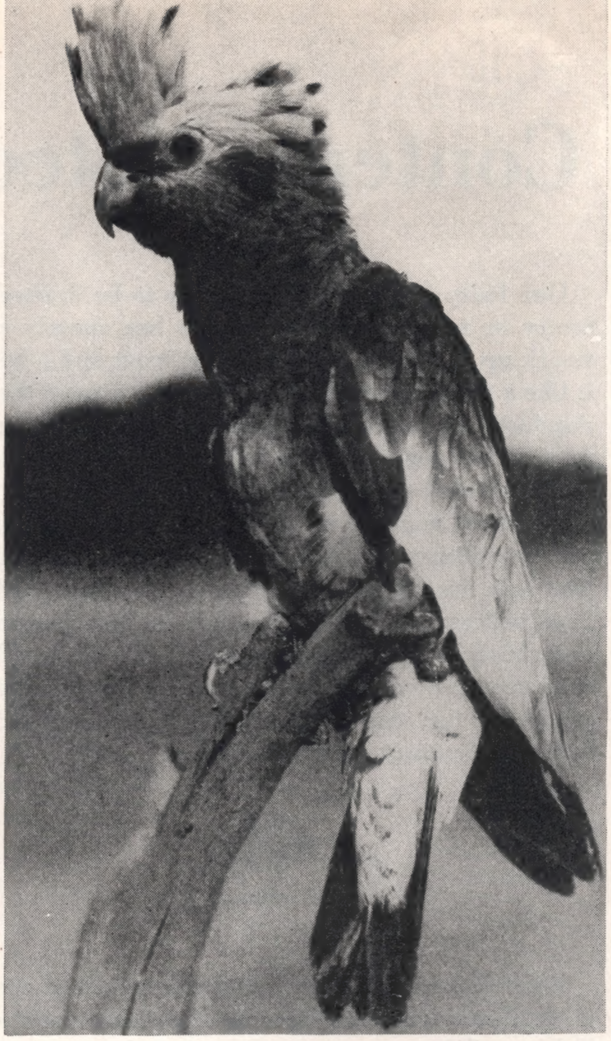
★

Restrictions—necessary restrictions in time of war—have been placed upon magazines. These are physical restrictions, not editorial. Paper must be conserved, and *Nature Magazine* is zealously abiding by the orders in this regard, as it will with respect to every regulation pointing to inevitable victory. In the process, however, we will not sacrifice the editorial contents of the magazine. We will make the savings to our own detriment and not at the expense of the reader. We have, in fact, intensified our efforts to make the editorial content timely, useful and entertaining. The loyal support of our members and readers is both needed and appreciated in these times.

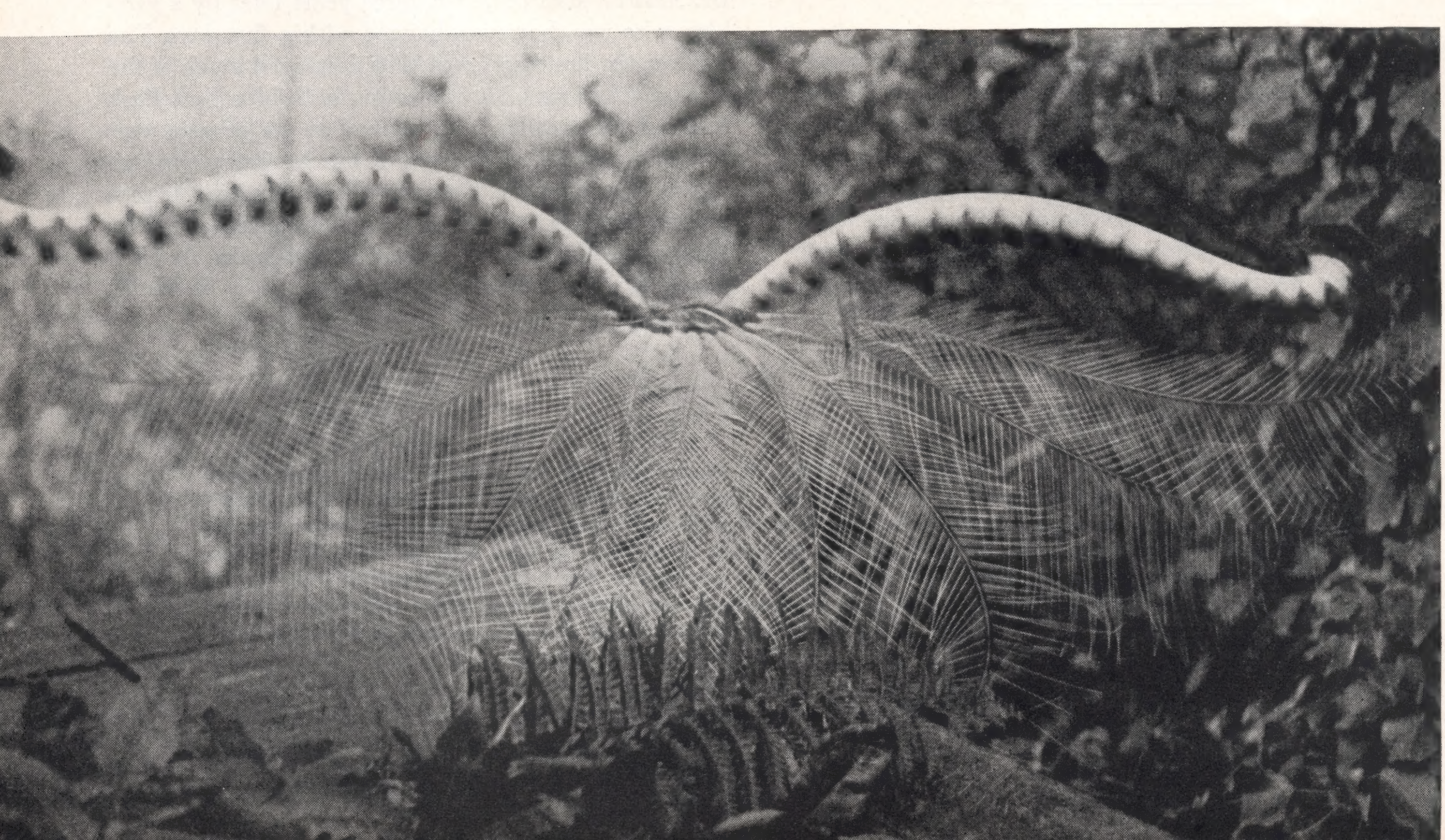


The kookaburra, or "laughing jackass", is Australia's bird humorist. Its loud, ringing peals herald the dawn in the Australian bush. It is one of the birds that has given that country a reputation for oddities in bird life.

(Below) The courting display of the lyre bird. With its feathers and tail thrown forward over the head and spread fanwise, the bird dances and sings, imitating the calls of many birds and other voices of the forest. The lyre bird is the world's master mimic. Photograph by F. Lewis.



The galah, or rose-breasted cockatoo. Cockatoos reach perhaps their greatest development in the Australian region. One of these is the blood-stained cockatoo, white except for red on the face. Like the galah, it nests in tree-hollows. Sometimes it takes over the nest of the galah, eggs and all, and brings up the galah's family, along with its own. Thus, in a measure, it makes amends for its act of intrusion and piracy.



While the fantastic birds get the publicity, there are many others of beauty and interest among the—

Bush Birds "Down Under"

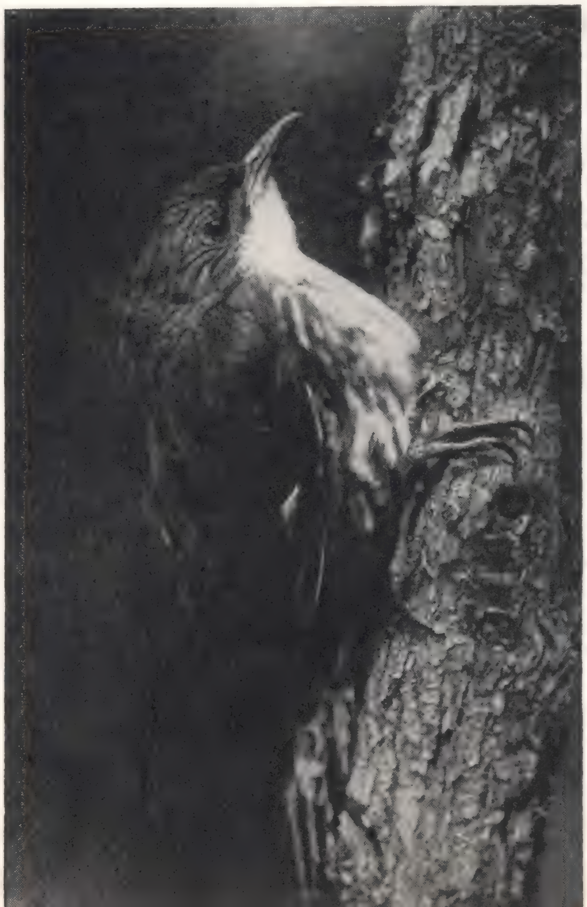
By DONALD F. THOMSON

Photographs, unless otherwise credited, Copyrighted by the Author

ARMIES, particularly in time of war, represent in their ranks the varied interests of a people. Besides the butcher, baker and candlestick maker, they include the bird lover, botanist and conchologist. Many amateur naturalists, because of the global scope of the present conflict, are finding an opportunity to discover, first-hand, the Nature store of far places. Those who find themselves on the great Australian continent, and who enjoy bird life, have many a treat in store.

To many people overseas Australia is a land of the weird and bizarre in animal life. This, no doubt, results from the publicity given to the strange platypus, the interesting kangaroo, the dainty little koala, and such distinctive birds as the kookaburra, or "laughing jackass." To many the Australian bush is a place of bright birds that are songless, and that seem to differ from what might normally be expected in a bird.

Such impressions are wrong. To be sure, the bush country holds gorgeously-plumed birds, such as the bee-eaters, the kingfishers and the army of honey-eaters—birds of varied hue, resplendent in red or green, or decked, like the beautiful regent honey-eater, in plumage of regal black and gold. There are other birds that may differ from birds of other lands, but in habits and color are just ordinary members of the avian congregation. Nor are all the bushland birds mute. Shrikes, or butcher-birds, seem to be much alike in habits the world over, and those of Australia have wonderful songs. The warbling notes of the magpie at the first gray of dawn is a memory that lingers. The lyre bird, clever mimic, aloof and mysterious, has the voice of a great and versatile artist.



The Australian white-throated tree-creeper, erroneously called a woodpecker by many in the country. There are, however, no woodpeckers in Australia.

Perhaps the bird that will dispel, once and for all, the idea that Australian birds do not sing is the gray or harmonious thrush. Its mellow, soft liquid notes are lovely beyond expression. Also, in keeping with the rule that all great songsters are soberly, even somberly, clad, this thrush is a study in plain browns and grays. In the bush it is one of the friendliest of birds, the first to visit a camp in the bushland, and snapping up odds and ends of meat and crumbs. In apparent thanks for this it will often fly to the roof of a bush hut, or to the ridge-pole of a tent, and pour forth a recital.

To hear this bird at its best, however, one must choose a dull day in Spring, and among the mountains. This, of course, is in August and September, when a dense mist may hang like a pall over the hills. The great gums are now visible, and now shrouded in the drifting curtain, and the damp chill air encourages one to lie abed. At such times the thrush is in his element, opening his songster's heart to pour forth a melody now sweet and low, now rising with exultant fullness. There is a warmth, softness and intimacy in this song that one fails to find elsewhere among the avian choir anywhere in the country.

Among the smaller, less conspicuous, but definitely vocal birds are the often noisy honey-eaters of several species. There is the heath wren, an accomplished mimic, and the tiny brown tit. There are catbirds that "yowl"; fairy martins that build nests shaped like bottles on the sides of trees; several flycatchers that build the dainty nests of their kind; and two bell-birds, the bell-miner with a tinkling call, and the crested bell-bird, whose solo has a beautiful bell-like quality. The list of such birds is long and includes birds of bush and shore, but most of them are not very different from other small birds elsewhere—just

Australia's national bird is the emu, appearing on the coat of arms of the country. Here it is shown in full plumage. It is, unfortunately, persecuted for economic reasons.

different enough to delight the true lover of birds.

Perversely, however, the layman seems most interested in those birds that might be called freaks, with characteristics that make them individualists in the avian world. There is no question that they are interesting because of this individualism. One such is the kookaburra, or great brown kingfisher. Its picture has travelled widely on an Australian stamp, and its claim to fame lies in its laugh. Loud ringing peals of laughter resound through the bush in early morning and in the evening, coming, indeed, with such regularity that the bird is sometimes known as the bushman's clock.

Also publicized by the postage stamp method is the lyre bird, whose wonderful "lyre" tail and accomplishments as a mocking bird give it a dual claim to bird distinction. During the winter season this bird builds for himself a dancing mound, upon which he holds grand concerts, and dances and displays his lyre to the lady of his choice. It was long charged that this bird possessed several mates, but this libel now appears unfounded. This idea appears to have resulted from the fact that the young males seem not to have a fully-developed "lyre" for several years, and during their adolescence consort with the females, for which they are mistaken.

The lyre bird makes its home in the deepest and darkest of mountain gullies, or in rocky ravines in southeastern Australia. It shuns the dry interior, and is not found in western or northwestern Australia or in Tasmania. In suitable habitat its range is limited and it is abundant. It is friendly and takes kindly to the haunts of man, often regaling him with its concerts even near Melbourne. On its mound, however, the bird is shy, and few have seen him in full display, for he lacks the peacock's taste for display to the vulgar gaze. Indeed, when the male is showing off, females seem to be on outpost duty, often sounding an alarm, when the music is hushed instantly, and the intruder may have only a glimpse of the brown form and trailing gray and russet tail feathers disappearing into the undergrowth.

On the mound the bird does not hold his tail erect as he is pictured in most drawings in bird books. Rather, he brings the delicate, filmy feathers over his back, and carries the two long "sickles" on each side of the tail, close alongside his body, or almost at right angles to it. Then he prances and stalks slowly backward and forward, vibrating the wonderful tail until the feathers give an audible rustling sound. He is like an expensive mannequin displaying some gorgeous creation from fairyland.

This display is accompanied by a most extraordinary mimicry of bush sounds—the "crack" of the coachwhip bird, the laughing notes of the kookaburra, the screeches and other cries of the parrots and cockatoos, and the notes and twitterings of the lesser bird fry. All of these sounds are reproduced so faithfully that it seems impossible that such a medley of notes could issue, in rapid succession, from the throat of one bird. But they do.

The bower birds, of which there are several species, also enjoy their share of fame. This comes from their playhouses, which are more elaborate than the mounds of the lyre bird. These bowers are built on the ground

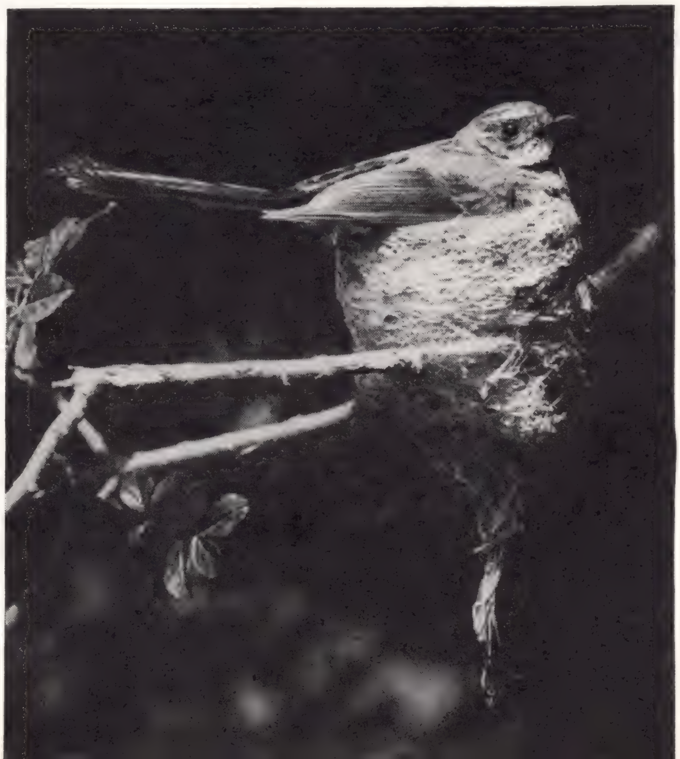
The gray or harmonious thrush is the queen of Australian song birds and one of the outstanding avian singers of the world. This bird's song disposes for good of the impression of some that Australian birds are mute.

and are quite separate from the nests in which the eggs are laid, and the young birds reared. The Queensland bower bird builds a large and elaborate bower, with a runway between the two side walls. There it accumulates large quantities of shells from sea and land mollusks, pebbles of white quartz, odds and ends gathered in native camps, forest fruits, and bizarre and brightly-colored galls.

On Cape York peninsula I found this splendid species—distinguished from the others by the lilac-colored plumes on the nape of its neck—quite numerous. The birds, sometimes singly and sometimes accompanied by a party of females and rival males, came to the playground soon after daybreak. They checked over the hoarded trinkets, and, if they seemed to have been interfered with, there followed some angry scolding.

No less remarkable is the satin bower bird of southeastern Australia. It is numerous in Gippsland forests and in the national park near Sydney. It is not as elaborate in its bower-building as its Queensland cousin, but it shows a remarkable discrimination in selecting objects to adorn its bower. It seems to choose only objects of blue, the color of its own irises. The satin bower bird is more handsome, however, and the adult male is a uniform shining metallic blue of exquisite beauty. Unfortunately such birds are comparatively rare because the male assumes this splendid plumage only toward the close of its normal span of life.

One of the most exquisite pieces of bird architecture is the "wine glass" nest of the white-shafted fantail. The nest is constructed of rootlets and decayed wood, the whole being interwoven with cobwebs.



When one is dwelling on the oddities of habits among Australian birds it is impossible to ignore the tribe that bury their eggs—the jungle fowl or Megapodes. These birds do not brood their eggs or tend to their chicks. Instead, they build natural incubators on the ground, constructing them when moisture and temperature are sufficient to cause the vegetable debris with which these mounds are filled to decompose and generate enough heat to incubate the eggs.

Among the birds that use this method of raising a family are the mallee fowl of Victoria, South

Among the singular Australian birds is the frogmouth, related to our nighthawks. The adult mimics a dead and broken limb, and the youngster pictured here bluffs by assuming a terrifying attitude to intimidate its enemies.

Australia and New South Wales, and both the scrub turkey and the scrub hen of northern tropical Australia. These two latter begin nesting operations with the first rains. They excavate the old mounds used in former seasons and sweep into the crater great quantities of leaves and other vegetable debris. Both wings and feet are used in this task. It is a strange experience to come upon an area in a territory that one believed uninhabited and to find the ground freshly and neatly swept.

The eggs of these birds are relatively large and the chicks are quite well developed within the egg. They are able to run about—and even fly—as soon as they emerge. The eggs of the scrub turkey and scrub hen are relished by the aborigines, who mark the nesting mounds and work them regularly for eggs, roasting them in the ashes of their fires.

Perhaps one should not have left unconsidered so long the National Bird of Australia; the bird that appears on the Australian coat of arms. This is the emu, close relative of the ostrich and the rhea. Despite its distinction as a national emblem, the emu faces possible extinction, save in sanctuaries established for it. It is charged that it plays havoc among crops in settled districts, ruins fences and pollutes waters. Warlike slaughter was declared against it and its friends countered by pointing out the large numbers of caterpillars in its diet. It faces, too, the fact that its flesh is a favorite with the Australian blackfellow, and its bones are used for primitive implements. It is also alleged to have spread the prickly pear cactus, a plant pest, by carrying its seed. The vendetta against the birds was based upon prejudice instead of facts based upon scientific knowledge of its habits and diet. It may enjoy a breathing spell thanks to national preoccupation with a greater menace coming by air and sea from the North.

There are, of course, other strange birds in Australia, birds that are strange and wonderful to visitors from other shores. Tourists also find that there are no counterparts for many they know at home. While there are many birds of prey, for example, there are no vultures. Woodpeckers are entirely absent, although the white-throated tree creeper is commonly and mistakenly called a "woodpecker". There are no true finches, and those birds that go by that popular name are, while numerous and varied, really "weaver finches" or Ploceidae, as is our "English" sparrow.

While, of course, Australia does not possess a complete monopoly on strange bird forms, like the striking black swan with its red bill, it does have, apparently, more than its share. It is hoped that many of the men who have crossed the wide seas to aid Australia in its fight for freedom will come to know some of these and to be able to take home a first-hand picture of interesting bird life of the land "down under."

Tungsten, the fantastic, is the element that gives to steel the strength to do a wartime job at—

Red-Hot Speed

By EUGENE W. NELSON

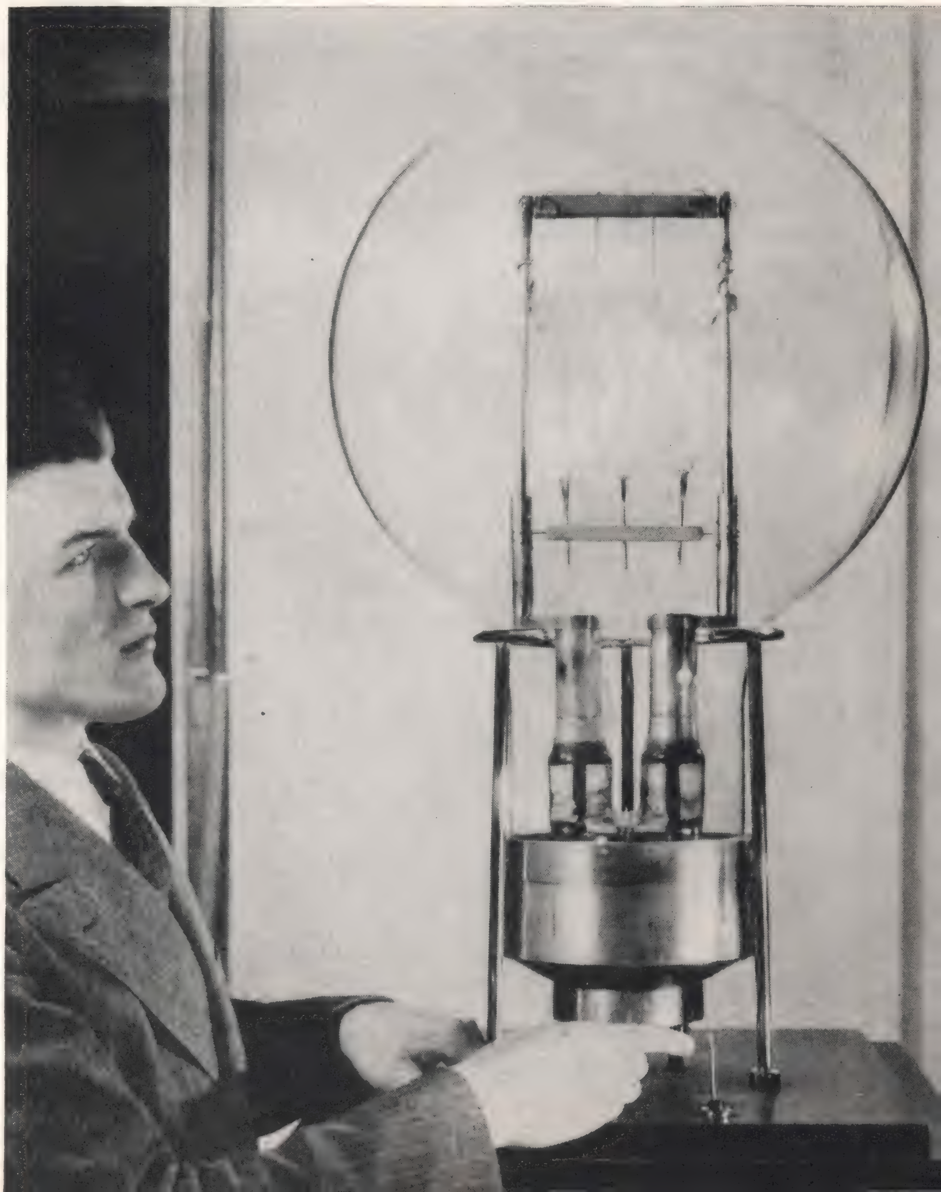
TUNGSTEN is one of the most fantastic metals known to science. Every night, and often during the day, we use it in its pure form. It is nearly twice as heavy as lead, and its tensile strength is double that of a good grade of heat-treated alloy steel. Most pure metals are very soft. Gold, tin, lead and copper are good examples. Tungsten is extremely hard and has the highest melting point of any metal. Our entire country has never used more than a few thousand tons of it a year, yet it has made possible our modern age of mass production. It is doing its share to help us win the war; has given red-hot speed to production lines of industry.

The story of tungsten really starts before men knew there was such a metal. It starts with the cave man who sought harder and ever harder flints to shape the softer rocks into his primitive weapons. Then copper tools came into existence, and, about 3200 B. C., man invented bronze. Finally came iron, some time during the thousand years preceding the Christian era.

Progress in tool materials halted then for a long time. Even until late in the nineteenth century most tools were still made from wrought iron, which is practically pure iron that will not harden appreciably even when cooled in cold water from a white heat. All tools were made by hand by a highly-specialized blacksmith known as the tool smith.

For good tool steel the smith depended upon what he called a "blister bar". Within limits, the more carbon in steel the harder the steel. Wrought iron has practically no carbon, and blister bars were made by adding the necessary carbon to pieces of wrought iron by the "cementation" process. This process had been known to a few of the ancient metal workers, but all knowledge of it seems to have been lost after the fall of Rome, to be discovered in Europe early in the 1600s.

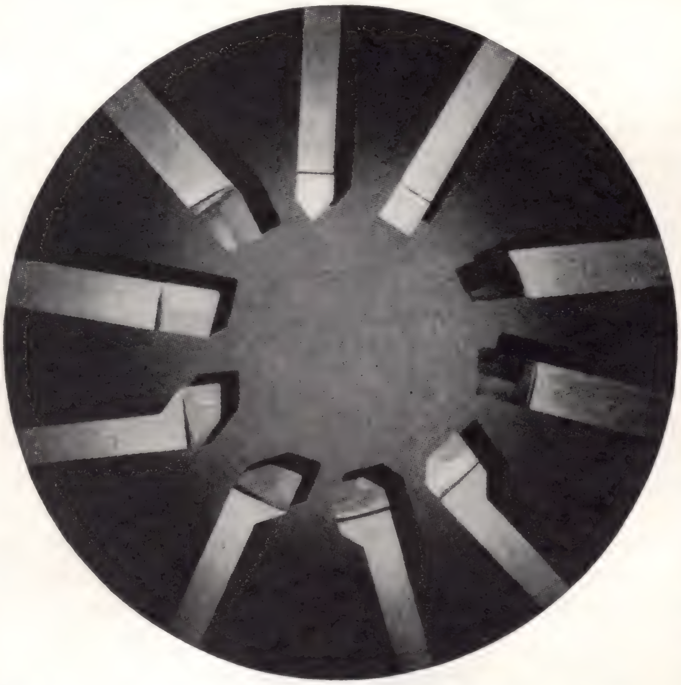
In the cementation process, charcoal was sprinkled on the floor of a large brick furnace. Wrought iron bars were laid on top, another heavy layer of charcoal added, and so on until the furnace was filled to the roof. The furnace was sealed up air-tight with fire clay, fired, and held at high heat for a week or ten days. During that time, the iron slowly soaked up a little carbon from the charcoal. But steel made in this way had many drawbacks, the chief one being that there would be more carbon near the surface of the metal than at the center of the piece. This made the material



The world's largest incandescent lamp, rated at 50,000 watts and developed by the General Electric Company at Nela Park, Cleveland. When fully lighted the lamp gives a light equivalent to that from 2000 ordinary 60-watt bulbs. The tungsten filament weighs more than three pounds, enough of the metal to make filament for 150,000 of the 40-watt frosted household type bulbs. This lamp giant requires several minutes of preliminary heating before it becomes fully brilliant.

unreliable, and led to much waste of time and materials.

Still, up until 1742, this was the only steel available for cutting tools, knives and weapons. In the first half of the eighteenth century, in the English village of Handsworth, near the great steel center of Sheffield, there lived a clock and tool maker named Benjamin Huntsman. Like other craftsmen of his time, he had trouble using the blister bar steel. Huntsman decided to do something about this. He chose good blister bars, broke them up into small pieces, and placed the bits in clay crucibles. These he put in a coke fire and left them there until the pieces of blister bar had melted and the carbon had become uniformly mixed throughout the molten mass. He poured the resultant steel into small molds, and in the ingots thus obtained was the best and most reliable tool steel the world had ever known. Huntsman had rediscovered the crucible process for producing fine steels, for it, too, had been practised in a limited way by ancient metal workers.



To save this rare metal, tungsten-steel tips are cemented to the ordinary steel of the rest of the tool. Photograph courtesy of the Carboloy Company.

Huntsman tried to keep his discovery a secret, but it was too great an advance to be hidden, and soon his method became common knowledge. However, this process was expensive, so tool smiths developed a technique whereby they could make a little of the precious stuff go a long way. This was the technique of the laid tool.

The smith would first rough out from plain wrought iron any tool that had to have a cutting edge or point. Then, upon this rough blank, he welded a strip of the high carbon crucible steel and fashioned it to a cutting edge, hardening and tempering this strip and finishing it on his grindstone. That technique lasted up until late in the past century. There are still men in our country who can fashion laid tools at a forge just as they did fifty years ago.

However, even before that time, craftsmen had begun to demand better tools, and, what is more important, bigger tools, in order to make such things as steamboats, trains and harvesting machines. It is impossible to harden thoroughly a very large tool made from plain high carbon steel by heating it and plunging it into water. So men began to try to improve steel itself.

This was a momentous idea, and it had momentous results. In 1868, in Sheffield, England, near the home of Ben Huntsman, Robert Mushet worked as a metallurgist at the great Clyde Steel Works. He experimented with tool steels, adding varying amounts of the elements manganese and tungsten to high carbon crucible steel. He found that this alloy steel would harden through and through if heated and then merely cooled in the open air. "R. Mushet's Special Steel", as it came to be known, was far harder, and cut much better and faster, than the plain carbon tool steel. The importance of the discovery, however, was far greater than any actual work that was done with the steel itself. It proved, once and for all, the practical value of alloy steels. Also, this discovery introduced to the world the commercial use for tungsten.

Tungsten the metal was not new at the time Mushet made his investigations. Karl Scheele, Swedish chemist and brilliant scientist, had discovered the existence of this element in 1781. Two Spanish chemists, the brothers d'Elhujar, produced the first specimens of metallic tungsten in 1786. However, tungsten was so hard to work with that no commercial use had ever been made of it until Mushet discovered the unique properties that it confers upon steel.

For twenty-five years after its invention, "R. Mushet's Special Steel" reigned supreme as the cutting metal. It was made into lathe tools for turning steel, brass, and cast iron. It was used wherever industry had any hard jobs of metal cutting to perform.

Realizing what alloying would do for steel, metallurgists finally threw off the inertia of the centuries and began to try to improve on Mushet's metal. They succeeded far beyond their wildest dreams. In 1898, Fred Taylor, an efficiency engineer whose hobby was metal cutting and machining, teamed up with metallurgist Maunsel White in an exhaustive study of tool steels at our own Bethlehem Steel Company. The results of their work were displayed for the first time at the great Paris Exposition of 1900. The tools that those two Americans had produced startled the entire world and helped to change our entire civilization.

At that time, tools for lathe use made from the finest crucible steel had an average cutting speed of thirty feet per minute. Peeling off a thin streamer of steel at a speed of fifty feet a minute was considered dangerously high, because beyond this speed the heat of the turning operation would draw the temper from the cutting edge and ruin the tool. "R. Mushet's Special Steel" did a little better, of course, but the Taylor and White lathe tools ran for hours at the unheard of speed of 150 feet per minute. Even more wonderful, these tools continued to cut metal even after their tips had become red hot! Taylor and White had developed a new tungsten-chromium-steel alloy that was "red hard".

By 1905, these "high speed cutting steels" were on the open market. One of them—made up of 18 per cent tungsten, 4 per cent chromium, 1 per cent vanadium, and the rest steel—was of essentially the same chemical composition as the kind of high-speed steel most widely used today.

High-speed steel tools had arrived, and no opposition that the old timers could offer halted the acceptance of these tools by industry. But the introduction of this new metal from which to make machine tools was far more momentous than the men of that time realized. Tools had to be redesigned to fit the qualities of the new steel. The machines that used these tools had to be remodeled to take advantage of their greatly increased efficiency and production. The ever-widening use of high-speed cutting tools created a complete revolution in the machine tool industry; in industry as a whole, for that matter. These tools have formed the keystone of our modern era of mass production, and it is absolutely impossible to evaluate accurately the economic importance of this one kind of alloy steel.

Some idea of the enormous changes that have been wrought, however, can be gained when we realize that machines today, using cutting tools made possible by tungsten, can shave down a slab of ordinary steel as though it were nothing tougher than soap. Modern tools can remove seventeen pounds of shavings and chips from a steel forging or casting in one minute. Thus metal is now being worked and fashioned 68 times as fast as it possibly could be in 1900!

Back of all this speed and progress lies tungsten the fantastic. The machine tools it has made possible carve and shape all kinds of metals into the necessities and luxuries for our complex existence. The machine tool is the hub of the industrial wheel. Without it, and all the machines that it produces, there would be no low-cost production of the many articles that we have come to take for granted in peacetime. Nor would there be any high-speed production of weapons with which to defeat our enemies. And tungsten is the element that gives hardness to the steels from which are made the cutting tools used in the lathes, drill presses, milling machines, planers, shapers and automatic screw machines.

Development of twice-coiled filament by General Electric. Here we see (top) the new type, (center) the former coiled filament, and (bottom) enlargement of a human hair.

What of tungsten itself? It gets its name from a combination of the two Swedish words for "heavy stone", for pure tungsten *is* heavy. It is twice as heavy as lead; nearly as heavy as gold. A little one-inch cube weighs twelve ounces! Its chief ore is "wolframite", a lustrous, brownish-black mineral found mainly in China and Burma. Another tungsten ore —"scheelite", named after Karl Scheele—glows with an eerie phosphorescent light under the rays of the ultra violet lamp. So the many prospectors in our country who are hunting for tungsten right now look for it with lanterns at night!

The ore is ground to dust and treated chemically in successive steps until the yellow tungsten oxide is formed. The oxide is placed in narrow metal troughs, and these "boats" are passed through heated tube-furnaces. Hydrogen gas in the furnaces removes the oxygen from the tungsten oxide, leaving pure tungsten metal in the form of a grayish powder. The powder is molded into a powder-ingot in a hydraulic press, then set between electrodes and given a 3000 ampere wallop of electricity. The powder particles instantly fuse into a piece of solid metal. The average ingot made in this manner is about fifteen inches long, half an inch square in cross section, silvery in color, and weighs more than two pounds.

Pure tungsten metal finds its greatest use, of course, as the filament wires for electric lamps. It is not produced in the metallic form when used to make high-speed steels, however. Instead, one of its ores is mixed with charcoal and heated in an electric furnace. A tungsten ore that also contains iron is generally used, so that in the furnace the tungsten combines with the iron to form a "master alloy" known as "ferrotungsten". This contains about 80 per cent tungsten and the rest iron. This alloy, together with small amounts of chromium and vanadium, is added as needed to the crucible or to the electric furnace in which the high speed steel is being made.

Tungsten gives steel various properties, but the most remarkable one is that of "red hardness". This means that the tungsten-containing steel will retain its hardness, temper, and cutting edge or point even when red hot, or at temperatures far beyond those at which ordinary steels will begin to soften and lose their strength.

In making this almost unbelievable material—which is not, strictly speaking, a *steel*—pure powdered tungsten is mixed with lampblack. In a terrifically hot furnace, these two substances combine to form tungsten carbide. To tungsten carbide is added a "binder", a substance that later on helps to hold together individual particles of the material. The element often used for this task is dark-gray cobalt metal. Now the final mixture is placed in a mold, squeezed under many tons of pressure, and sintered; that is, heated in a furnace so that the grains of material fuse together into a uniform mass. An intensely hard, ready-shaped tool is the final product. Nothing but a diamond grinding wheel can change this tool's shape.

It was Germany who led the way in the development of these "sintered carbide" materials. They are not only much harder than tungsten steel, but they also make a limited supply of tungsten stretch a long, long way. Instead of fashioning an entire lathe tool or planer tool from the material, the shank of the tool is of steel and only its actual cutting tip is of the expensive tungsten carbide substance. These tips, or insets, are manufactured in numerous shapes and sizes and are permanently fastened to the cutting tool shanks by brazing. These new tungsten tools have speeded up machining all the way from twenty per cent to two hundred per cent, and they have reduced the cost of machining operations anywhere from twenty-five per cent to seventy-five per cent.

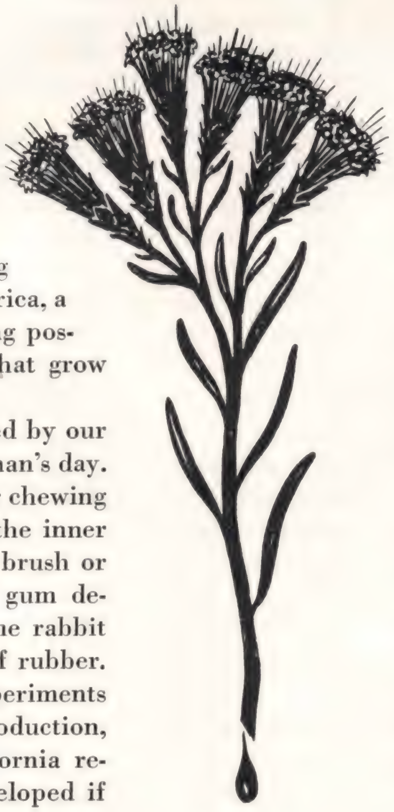
The War Production Board reports that the 1939 production of tungsten doubled in 1941, and in 1942 was doubled again. Large imports in 1940 and 1941 helped to build up a large stockpile before the war in the Far East cut off Oriental sources. However, South American production has been stimulated and Argentina, Bolivia, Chile, Peru and Mexico will be our principal foreign sources of supply. In the meantime sources have been sought in the United States, and a California deposit will yield seventeen per cent of the new tungsten for 1943. Another plant in Nevada is doing a comparable job, with the result that the 1943 tungsten shortage is not expected to be much more than ten per cent.

When victory is won we must give its share of the credit to the metal that is twice as heavy as lead and twice as strong as steel; to the metal that gives cutting tools the "stuff" to be able to take it at red-hot speeds—to tungsten, the fantastic.

* * *

Indian Rubber

By
ELLSWORTH JAEGER

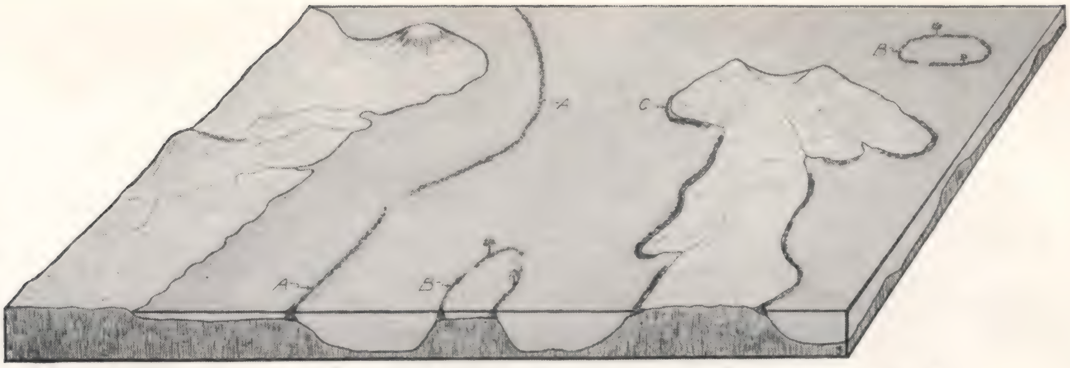


WITH our sources of rubber supplies in the state they are, we are seeking substitutes. There are, in North America, a number of plants that have rubber-producing possibilities. Many of them are hardy weeds that grow prolifically in our fields and vacant lots.

One plant source for rubber was discovered by our southwestern Indians long before the white man's day. However, they used it, not for rubber, but for chewing gum. They obtained the gum by stripping the inner bark of a common desert shrub, the rabbit brush or chamisa. They chewed this bark until the gum developed. Scientists have discovered that some rabbit brush plants carry as much as 6.5 percent of rubber.

During the first World War, extensive experiments were made with rabbit brush for rubber production, and scientists from the University of California revealed that a possible source might be developed if this plant were extensively cultivated. Today, when rubber is so vital in our war effort, it is again being seriously considered, since is grows prolifically in the desert areas of the vast Southwest. The pure product from this plant has been given the name of "Chrysil" derived from its generic name *"Chrysothamnus"*, and it is thought that some 300,000,000 pounds are present in the native plants.

The bluish-green leaves and golden-yellow flowers of rabbit brush are a common sight in New Mexico and Arizona. The flowers provide a yellow dye.



A coral reef may have any shape, but according to their relation to the nearest land and their general configuration all reefs fall into one of the three types shown above. Barrier Reef (A); Atoll (B); Fringing Reef (C).

Coral Reefs and Coral Islands

By HOBART E. STOCKING

IF THE enquiring reporter of not long ago had asked the man in the street to identify Baker or Howland, Jarvis or Palmyra, one guess would have been as good as another, and probably he would have gotten a wrong answer. Now that enquiring reporters have been converted to news-analysts for the duration, practically any passerby not too preoccupied with rationing can instantly identify these names as land dots in the South Pacific. The exigencies of war have promoted them from relative obscurity to a position of prominence in the public mind. Baker, Howland, Jarvis and Palmyra are, among hundreds of others, miniscule coral islands of great strategic importance, and on them may depend the existence of nations.

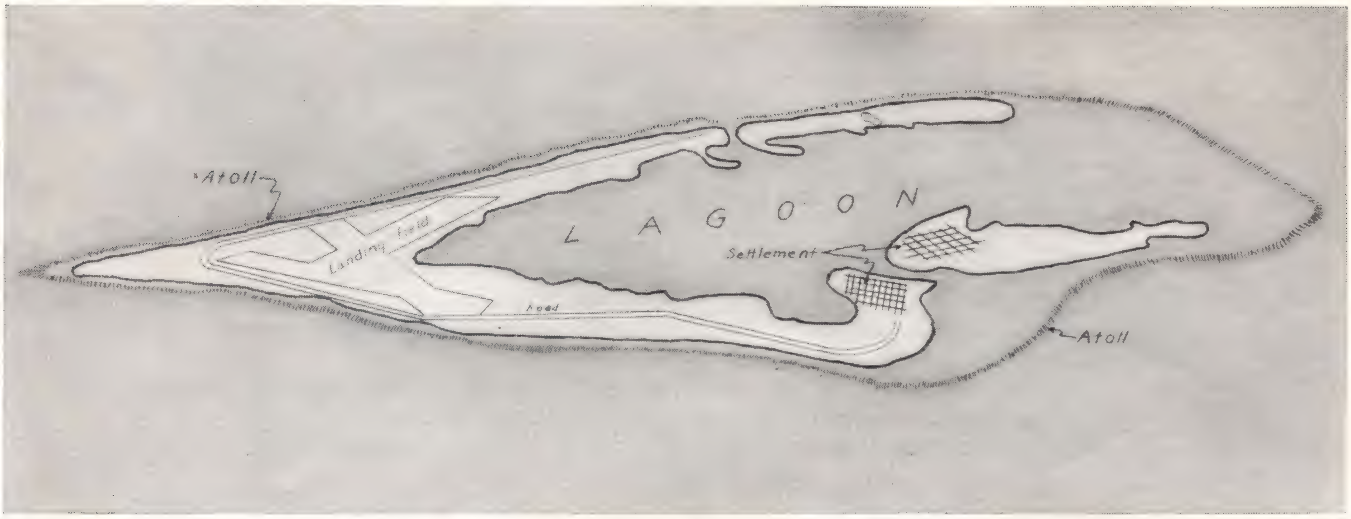
Even in the days of their obscurity these islands were not wholly unknown. Mariners read their charts and carefully avoided these small breaks in the ocean wastes. Perversely, geologists sought out and visited them. Charles Darwin, famous naturalist of the renowned *Beagle*, was one of the earliest of many to study the myriad coral reefs and islands studding the Pacific. In his day their international status was merely that of nautical hazards. Yet he found them, as have others, fascinating localities for those who seek, in every corner of the world, clues to the history of the earth. From the detailed, repetitious and divergent descriptions by hundreds of observers who have studied thousands of corals in as many localities, may be constructed a natural history that not only explains much about modern coral reefs, but which also throws light on the nature of oceans a million years in the past.

Corals grow in ocean waters of all depths less than 6000 feet, and at all temperatures from lukewarm tropic waters to the frigid Arctic wastes. However, no one type of coral lives under such a variety of conditions, and it is only those that live in the luxurious comfort of tropical surroundings that thrive in superabundance and build the coral strand of the poet and the perilous reef of the mariner.

Among corals the reef-builders are regal in their environmental requirements. They demand, first of all, that the waters be warm. They languish and die in water cooler than 68 degrees Fahrenheit. Hence there are no coral reefs except in shallow waters of tropical regions. Reef-builders require that the waters be clear and salty. Reef corals have myriads of cilia on their soft parts, and with these they can remove inedible matter from their mouths, but they are incapable of cleansing themselves of the volume of silt that settles from muddy water. In turbid waters they die.

The coral reefs that fringe islands always have openings in the vicinity of the mouths of streams, for the fresh flood waters from the land are silt-laden and even a thin layer of silt is a heavy blanket of death for corals. The natural history of reef corals may have strategic importance. To a landing party on an unknown coast, at a time when speed means life and delay death, the casual knowledge that all fringing reefs are breached in the vicinity of even small estuaries may be a veritable gem of wisdom, and its possession the weapon of success.

Corals, from an architectural standpoint, are artists of superlative skill. Like their human prototypes, reef corals thrive best basking in bright light with a full stomach. Since even limpid marine water absorbs light, reef corals confine their activities to depths of less than two hundred feet. Below that even bright sunlight is dim. Furthermore, the plankton on which corals feed is most abundant in the upper layers of the ocean. Since reef corals beyond the larval stage are



On the opposite page is Wake Island from the air, as photographed at the time American forces raided the Japanese-held island. Wake is a beautiful example of an atoll—the outer edge of the coral reef that forms the roughly circular enclosure is marked by a line of white breakers where the Pacific swells curl over the reef. Coral debris heaped above ocean level formed the land, and warm currents carried seeds of plants, which now cover most of the islands. Wake Island rises only a few feet above the Pacific; but it is protected from storm-waves by the atoll. The interior lagoon, with an opening through the reef on the far side, provides a safe anchorage for ships and seaplanes. The sketch-map interprets the official U. S. Navy aerial photograph.

firmly and permanently fastened to solid ocean floor they endure and spread only when they are fed by a constant current.

The number of coral reefs dotting every chart of the Pacific is amazing. Even more incredible is the fact that all the various factors that promote their growth are present simultaneously in so many different localities. Throughout the long chain of the Hawaiian Islands, ending, on the west, with Midway, all the required conditions are present and reef corals abound. They reproduce themselves by fantastic proliferation of buds or by discharge of larvae. Discharge is the proper term for no care is wasted on reef coral embryos. These millimeter blobs of protoplasm, equipped with a long thread of a tail, are on their own from the moment of emission. A larva of Hawaii, floating fancy-free in warm currents, may have a natal voyage of thousands of miles before settling down to the serious business of reproducing more of its kind.

In the westward-flowing Tropical Current the larva may be carried past Johnson Island, where myriads of its kind thrive, on west and south to Truk in the Carolines, the fortified stronghold of the Japanese in the southwest Pacific. The annual production of free-floating larvae must number in the billions, but only a few, relatively, survive the vicissitudes of travel and come to rest in a healthy environment. Resting on shallow, clean, hard ocean bottom, the larva extracts calcium carbonate from sea water and secretes this lime in a basal plate firmly attached to the floor. On this foundation it erects the remainder of the complex structure that holds and protects the soft parts of the animal. Once established, a healthy coral increases the number of individuals of the community in which it lives by constant budding, or by larvae. Each bud becomes an independent coral, putting forth branches of its own. In a clump of coral the outer branches receive the most nourishment and a constant invigorating supply of oxygen. Depth, food and oxygen supply, and clean water determine the lateral spread of a colony, and the surface of the ocean is the limit of upward growth.

In any reef near the upper limit of growth there is an abundance of coral debris—broken fragments of dead coral—and this material, already near the surface, is heaped above that level by wave action. In time another coral island appears on nautical charts.

The debris from which coral islands are made is exceedingly porous, and in the vast expanse of salt water a coral island acts as a sponge to absorb the fresh water of every passing tropical shower. Since ocean water permeates the sponge, fresh water is present only in a thin layer close to the surface of the ground. If showers are infrequent even this becomes brackish in a short time. The availability of fresh water is a feature of importance in determining the strategic value of an isolated coral island, but in this machine age large scale distillation of ocean water may provide an abundance of fresh water.

A particular reef may have any form. This is determined by chance combinations of the several factors that constitute the ideal environment. In general, however, coral reefs fall into three types. When the ocean floor falls steeply from the land, water near the shore is shallow, and reefs that lie close in are termed "shore" or "fringing" reefs. Fringing reefs offer an impassable barrier to landing parties except through passages near the mouths of streams; elsewhere even canoes may not be able to approach the shore nearer than three hundred yards. In the Philippines the islands of

Mindanao, Panay, Cebu and dozens of others are fringed with intricate reefs.

Many large, non-coralline islands are bordered by a wide shelf shallowly submerged. The outer edge of the shelf, far removed from land, provides the clear, clean water required by reef corals, and here, too, warm ocean currents provide an abundance of food. In such an ideal environment corals grow, thrive and multiply in incredible profusion, and mark the outer edge of the submerged shelf with a barrier of coral hundreds of miles long. The most remarkable of all reefs is the Great Barrier Reef off the coast of western Australia. Separated from the shore by a lagoon twenty to thirty miles wide, and one to two hundred feet deep, the Great Barrier roughly parallels the western shore from Cape York, southward for a distance of twelve hundred miles. With a width of several miles, the Barrier is a natural bastion for defense of western Australia—one comparable to the Ural Mountains of Russia. Navigable passages through the Great Barrier are relatively few and are much more easily defended than twelve hundred miles of open coastline.

The Free-French island of New Caledonia, east of Australia, is the site of rich nickel deposits of strategic importance. It is similarly bordered by a submerged shelf whose outer edge is marked by four hundred miles of intricate barrier reef—a veritable navigator's nightmare.

The third and most romantic of all types of coral reefs is the atoll—an irregular, ring-shaped reef enclosing a tropical lagoon. According to romanticists of less turbulent times, the chief inhabitant of atolls, next to corals, was the tropical maiden with a ukulele; now it is a chip off the Axis equipped with a machine gun.

Atolls are now quite as strategic as they have been romantic in the past. Hundreds of Japanese-held islands of the Gilbert and Marshall groups are atolls. They comprise the north flank of a three-thousand-mile prong that the Japanese would like to extend across the United Nation's line of communication to Australia. The island part of these irregular coral rings is the familiar heaped-up debris of reef corals, and while the strip of land is long and narrow it is frequently of sufficient size to support a landing field and extensive military installations. It was in February, 1942, that an American task force carried out the electrifying raids on the Japanese-held atolls of Wotje, Kwajalein, Jaluit and Maloelap in the Marshalls.

Modern reefs, of course, are not found outside tropical regions, for there only (Continued on page 220)

If you live in the West, the beautiful azure mountain bluebird may be one of your garden guests.

With a little planning and planting we may collect dividends of pleasure from the—

Birds of Our Gardens

By JOHN LINDSEY BLACKFORD

Photographs by the Author

AMONG the "extras" that come with gardens are the birds. Whether it is the crimson flash of a cardinal from the treetops, the ecstasy of a mockingbird in jasmine-scented moonlight, or the cheery companionship of chickadees in the winter hedge, we are soon aware that the garden has bestowed a reward we did not earn.

Beside their contribution of color, melody and cheer, these feathered helpers are most active in the care of the garden. And, as so many have already learned, they contribute to the peace and solace there, which in these days so effectively renews strength and faith within us.

Of course bay-windowed robins will always tug at rubbery worms wherever there are a few unhappy vegetables; and sparrows will find rowdy weeds in disreputable fence corners. But by garden—the kind from which the dawn chorus swells on fresh May mornings—we mean shrubbery, lawn, verdurous trees, placid pool, and perhaps rocky nook or woodlot tangle, if we are so fortunate as to possess them. If you want a cedar waxwing, a rose-breasted grosbeak, or just a junco, jay, or bluebird, you can have them all. Ample cover, a bathing pool, some berry-bearing shrubs, and most important, a complete lack of cats, are certain to produce results. Then, if you care to add bird boxes in spring, and a small feeding station to your snow-decorated winter resort, the establishment will be doubly attractive.

First, I would say, this recipe calls for shrubs; dense, thorny, leafy varieties that provide shelter, refuge, and berries for bird lunches. Wide untrimmed hedges are preferred; next evergreens and broadleafs. You should have them anyway. Deep clusters of spruces, hemlocks, and firs, and borders of spreading juniper. Towhees, fox sparrows, ground warblers and thrushes are in demand to keep these small wood floors in health and repair. And the leaves, thousands of them on tree and bush, needing help against insect pests, will call to vireos, orioles, tanagers, chickadees and countless warblers.

Bayberries in the East, pepper trees in California, and, on the coast, elders with polished scarlet berries, prove irresistible. Virginia creeper is popular with flickers, tufted titmice, mockingbirds, brown thrashers and scarlet tanagers. Sumac entices Carolina wren, hermit thrush, towhee, goldfinch and bobwhite. Mountain ash, besides its orange-crimson clusters, yields Baltimore oriole, pine grosbeak and waxwing. Pungent fruit of sassafras lures the veery. Juniper tolls myrtle warblers, evening grosbeaks and purple finches.

Do not be surprised to discover downy woodpecker inspecting your fruit trees and willow stems for wood borers some crisp, snow-trimmed morning. Welcome him and his kind; they are expert inspectors and tree surgeons. In summer sapsuckers are their troublesome kin, but you may banish these gaudy fellows with paint applied to sapwells on birch trunks and alders.

There are many other fascinating feathered citizens of the garden—flycatchers, swallows, martins, nuthatches; even small owls may venture in. The day may not be far off when you spy a migratory killdeer or sandpiper by your pebbled pool, or a ground-loving dove nodding over ragged poplar leaves.

And now the best loved garden of all. Flowers, so precious for color, gayety, and perfume, have a winged attendant to match—the fairy ruby-throated hummer. He is their sole suitor east of the Mississippi, if we ignore bustling bumble bees, painted butterflies, hawk moths and smaller insect guests; out West there are more than a dozen species. One of them, the Calliope hummer, tiniest sample of birdlife within our borders, compensates in pugnacity for what he missed in size. The wasp-like buzz of his blurred flight, the starry gleam of lavender gorget, and the mousy shrieks and shrill chatter that assail any interloper among the delphiniums, are all part of Calliope's usual day. The tall, sapphire blue spikes of this flower or the delicate trumpets of the columbine are certain lure for the dazzling atom.

From leafy boughs and high shrubs beside the garden path, the pollen-colored yellow warbler sings a clear, excited *tsee, tsee, tsitsi wee see.* He is known to many as "wild canary", and she, unknown to you, may have a cradleful of fuzzy nestlings in the lilacs or the cherry tree at your elbow.

The jaunty catbird, or black-capped thrush, is a dweller in low coppices and willow borders. They are entertaining friends, and come readily to gardens that offer an abundant shrub layer. From its deep tangles their characteristic mewing call is familiar, interspersed with the sweet garbled song and harsh mimicry from higher perches. A slim gray form may be glimpsed stealing through the crowded stems, and at other times the bird, in short, pitching flights between clumps, shows how aptly it is suited to its dense abode.

The tall blue spikes of the delphiniums lure the Calliope hummingbird and his kin.

"Guardian of the Leaves" might well describe and name the red-eyed vireo or greenlet. If he were not colored like them, and were not always so busy among them, we should know him better. More often we are conscious only of his song, a refreshing recitative that banishes midsummer's oppressive heat and recalls to us the coolness of the bird's green bowers. No leafy shade is complete without him.

Downy woodpecker is the smaller model of the common black and white woodpecker that comes in two sizes throughout the country. His specialties are stream bottoms, orchards, and your shade trees in case you disclose even elementary hospitality. Those who prefer wood borers in their maples to the neat, efficient holes he drills in extracting destructive larvae will continue to descend upon him in angry delusion that "them dang-fool woodpeckers are killing my trees."

Robins are such willing associates that we take them for granted in the garden. The least ambition displayed with spade or trowel, and red-breast is there to harvest any fat grubs turned up along the row. He is a permanent fixture under the sprinkler, and a dozen of them on the lawn seems only natural.

The beauty of a flycatcher's nest in the hawthorn is another of the countless gifts shared by the garden. But we have a special duty to keep secret these treasures of the birds. Too often the slightest human disturbance will betray a nest to feline prowlers from over the backyard fence and the young family is gone.

The yellow warbler may adorn your garden with its nest and place a cradleful of fuzzy nestlings at your elbow.

Flower gardeners will do well to plant delphiniums. A certain reward throughout the West will be the black-chinned hummingbird. Sable throat bordered by a glinting, metallic band of violet, shimmering green and blue in the proper light, identifies the male. Flaming rufous hummers, Costas, blue-throats, Annas, broadtails, and Rivolis are other avian jewels claimed by western and southwestern states.

In bulletins available from the Fish and Wildlife Service, Chicago, Illinois, is found practical advice on the best trees and shrubs to plant in order to attract birds. Plan your plantings with their simple needs also in mind; not only will you win their joyous song and colorful presence, but soon there will be a bit of their green world about your door also.

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A First Aid to Diets

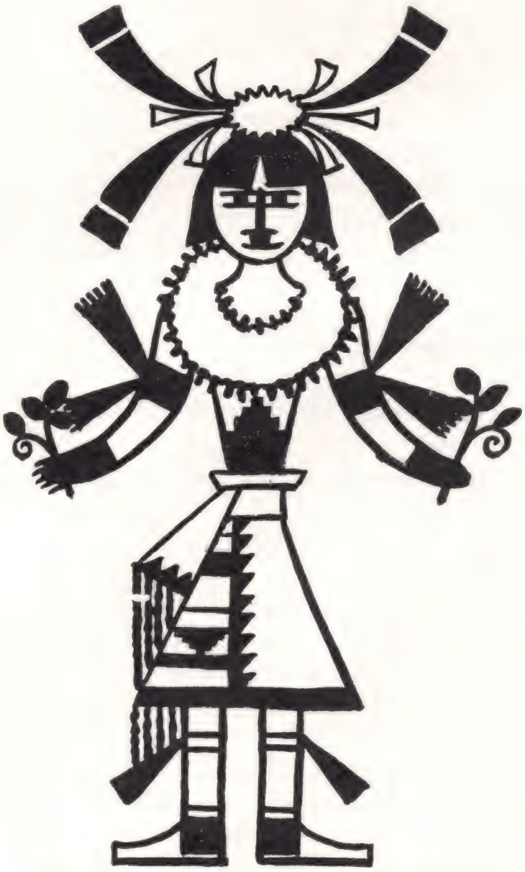
By ELLSWORTH JAEGER

In Arizona, Hopi Indians and their ancestors raised a vital defense vegetable a thousand years or more before it was "discovered" as a first aid to war menus. This is the lowly bean sprout, a green vegetable that is high in the vitamin food qualities, a veritable first aid to diets when other green vegetables are unobtainable. And this "crop" can be raised in a few days in any ordinary well-heated room.

In these war times, the needs of our allies and of our own people make overwhelming demands upon our producers, both industrial and agricultural. With many food-producing areas knocked about by ruthless invaders, the question of feeding the world has become most serious. And so victory gardens and victory foods are popular discussions by thinking people.

The Indians of the Southwest raise bean sprouts as a ceremonial food at the beginning of the winter dances in January and February. Inside the adobe kivas or sacred buildings, fires are kept burning for several days while the beans are sprouting in the moist earth indoors. Attendants see to it that the fires are hot and the earth is well watered.

Thus, in these primitive "hot houses", the Indians may sprout beans within a week. During the dances that follow, the bean sprouts are given to the children, along with other gifts, by the masked dancers. Every house in the pueblo, too, is visited and bean sprouts are left by the masked visitors. At the end of the ceremonial, there is great feasting in the adobe houses and huge stews bubble, in which bean sprouts are cooked to insure fertility.



Bean sprouts make excellent emergency greens because they contain a supply of Vitamin C, and few green vegetables can be grown so speedily to add to human diet.

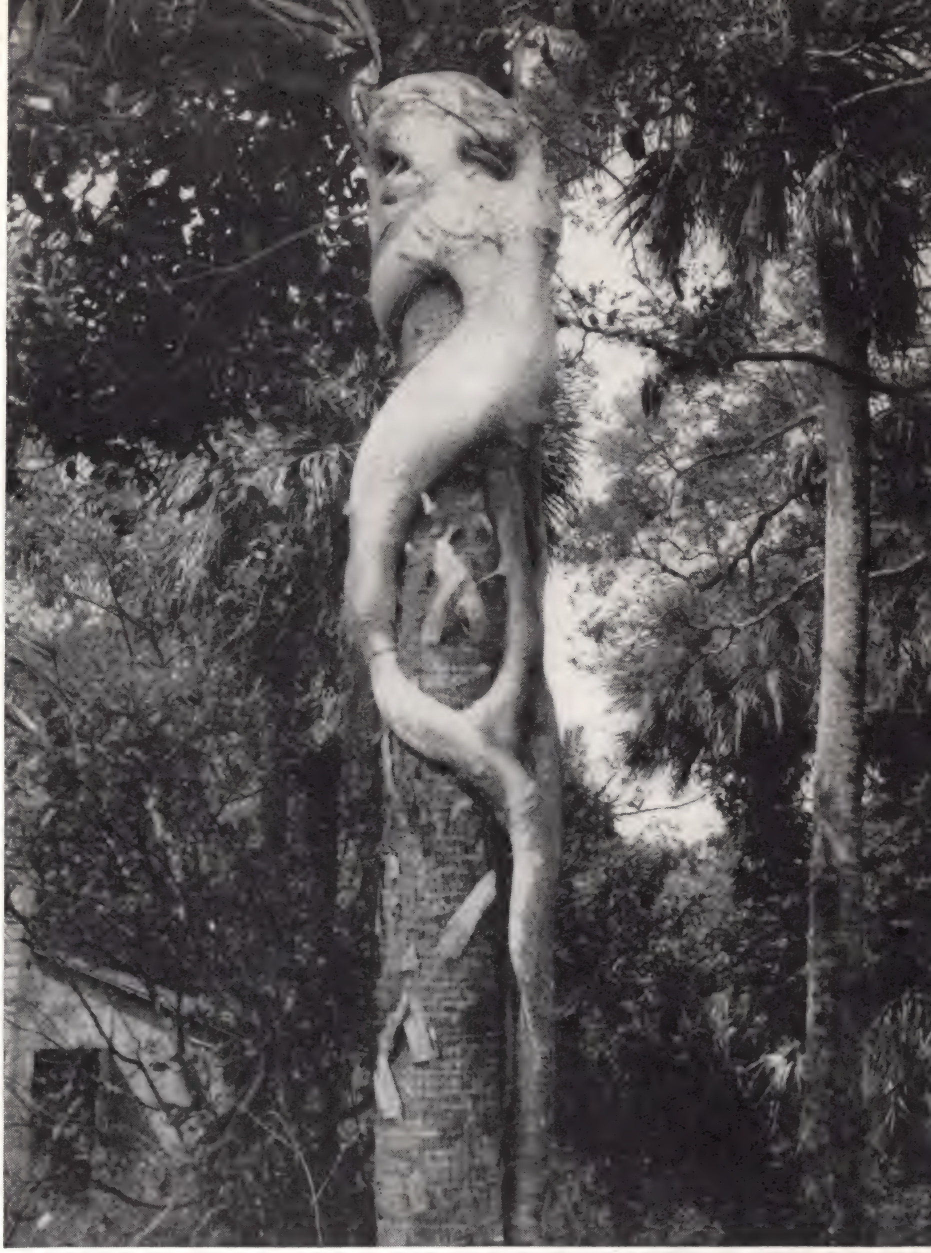
The Lady of Saint Lucie

By MAURICE BROUN

Photograph by the Author

A DAME of mystery, clinging aloft as though in fright, our "Lady of Saint Lucie" is none other than a bizarre and locally famous example of the strangling fig, *Ficus aurea,* of southern Florida. This fig tree—for it will in time become a small tree—has "taken over" a cabbage palmetto, which is doomed to die a slow death by strangulation. Incidentally, the strangling fig is one of upwards of six hundred species of *Ficus* related to the all-important rubber plant, *Ficus elastica,* which has helped to revolutionize civilization and to bring nations into mortal combat.

The Lady of Saint Lucie, as I have dubbed her, is growing in the village of Saint Lucie, on Indian River, in Saint Lucie County, Florida.



One Touch of Nature

By WILLARD HALLAM BONNER

AMONG famous sayings about Nature, one is widely misunderstood. It is Shakespeare's, "One touch of nature makes the whole world kin." Most ardent Nature-lovers think that this means that a little dab or bit of God's wonderful out-of-doors makes us feel warm, friendly, and loving towards all things—even Japs and cockroaches. Actually it is much less rhapsodic and much more worldly-wise than this. It is a bitter saying spoken by old Ulysses to young Achilles in *Troilus and Cressida.*

We are all familiar with the word "touched" meaning a little off; having a mild mental flaw; dotty. This is the meaning of "touch" here. Thus the bitter sage Ulysses is remarking that it is the flaw in man, the fickle, half-mad whims, that make people flock together in unanimous but temporary and merely fashionable agreement at the dictates of these whims.

Ulysses has just reminded Achilles that all fine things like noble birth, love, vigor, and charity are subject to envious and calumniating time, who has a wallet on his back wherein he puts "alms for oblivion." Achilles is foolish enough to think that his countrymen will remember his great exploits of the past. Ulysses says, not so; honor is kept bright by use. Achilles, who has been sulking in his tent, out of things, is forgotten; and the great lubber Ajax, a horse of a man, good for nothing, is clapped on the shoulder and is greatly esteemed by the great Greek lords.

"One touch of Nature makes the whole world kin
"That all with one consent praise new born gawds."

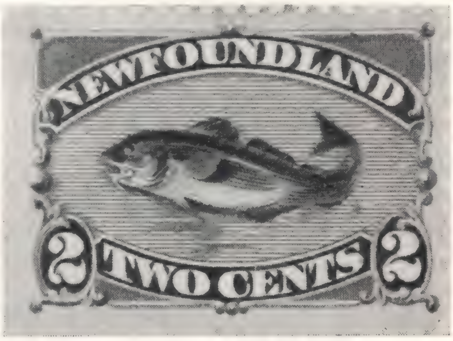
It is a cynical remark that calls the mad world to task for crowding after the current fashion, trinket, or gawd.

King Cod

By EDITH M. LAING

King Cod, jauntily twisting his tail, is pictured on a Newfoundland stamp. This fish is of great economic importance and has somewhat dictated the course of history, particularly for those settlements bordering his domain.

Cabot, Cartier and Champlain, each in turn, reported the rich fishing banks of Labrador and Newfoundland, with the result that for many years these banks were the subject of international politics and bitter rivalries. Hundreds of French, Spanish, Portuguese and English vessels annually braved the perilous Atlantic voyage, and the hazardous fishing grounds, to garner the treasure.



Many of the fishermen settled in Newfoundland and were vigorously opposed by the "fishing admirals" who wished to retain a monopoly of the vast fishing wealth. Certain of the English promoters of colonizing projects on the New World shores considered the fishing to be worth more than all the reputed gold of Mexico and Peru. Even before the days of Cabot the shores of cod waters had been visited by hardy Europeans, for evidences of fishing camps and rendering plants have been found.

The cod, *Gadus marrhua*, is found in the north Atlantic from Cape Hatteras north to Baffin Bay, and probably in the Arctic Ocean around the world, as it is found also in European waters. It spawns from October to June, and fortunately the eggs, which float on the surface and are eaten by hordes of enemies, are surprisingly numerous and the cod harvest continues. A cod weighing seventy pounds has been ascertained to contain upwards of nine million eggs.

Cod eat anything the sea offers—mollusks, crustaceans, worms, and small fishes. Sometimes a rare shell or fish that otherwise might have been lost in the waters has thus come to the attention of naturalists. In recent years porpoises, accused of destroying the small fish food of the cod, have been the objects of a crusade. Close students of the subject, however, attribute the diminution in the fishery to other causes.

Cod up to seventy or eighty pounds necessitate the use of heavy lines, not to mention stout arms and backs. Trawl lines have from six hundred to two thousand hooks affixed, or fewer for in-shore fishing.

Old-time methods are still used for cleaning, splitting, and laying cod out to dry. Indeed, St. John's deft-handed fisherfolk claim to be the champion fish cleaners of the world.

Because the flesh is not rich in oil, the cod is especially suitable for dry salting. In bygone days salt cod was the regular Lenten dish of Catholic Europe. Smoked cod is a table delicacy that holds gustatory pleasure for many.

Cod-liver oil, now demoted to lesser rank as the number one source of Vitamin A by oil from sharks, haddocks and other fishes, when unrefined is used in tanning leather, and the manufacture of soaps, paints and sprays. Glue is made from the skin and other waste, and isinglass from the inner lining of the air bladder. As with any commercial fish, the waste may be ground into a highly nutritious meal for cattle, pigs, and poultry.

The cod banks are a rigorous training school, and thousands of Newfoundland's small-boat fishermen, toughened by bitter toil, drenching fogs, and icy waters, are now efficiently manning ships in our own and the British Navy and in both Merchant Marines.

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Some Day

By E. F. HEYDINGER

Some day I'll not see a big bumble-bee
Swing from a wild columbine;
Some day I'll not hear a mother killdeer
Cry o'er her clay-knoll shrine.

Some day I'll not taste a cherry engraced
By a kiss from sun and rain;
Some day I'll not smell the dank of a dell
Nor kneel at a spring again.

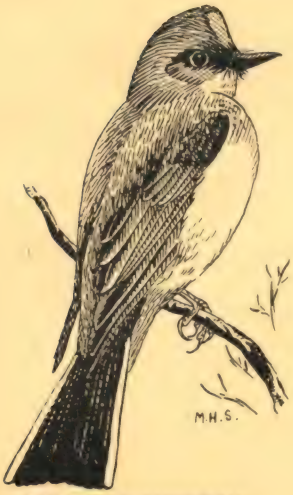
Some day I'll not feel the sun's warm appeal
That brings back the oriole;
Some day when I'm free, I hope there will be,
An office for my soul.

Some Western Birds

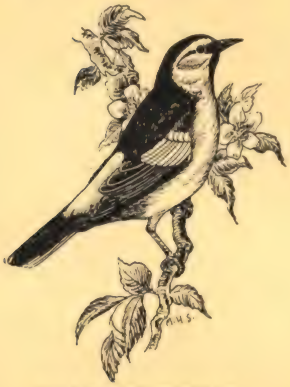
By E. LAURENCE PARKER

Illustrated by Hope Sawyer

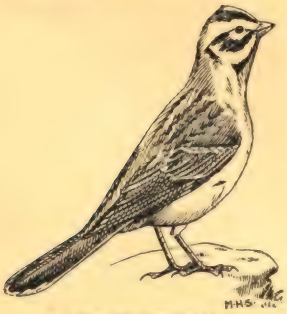
This is the twenty-fourth in Nature Magazine's series of educational inserts.



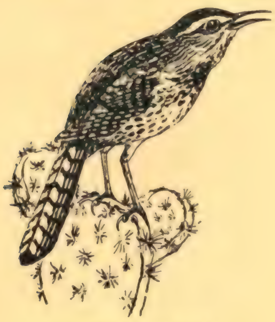
ARKANSAS KINGBIRD



BULLOCK'S ORIOLE



LARK SPARROW



CACTUS WREN

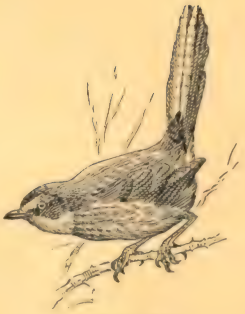
While hiking in the Eaton Canyon region near Los Angeles, I was joined by another hiker. He seemed much interested in what I was doing—until he learned that I did not happen to be a member of a noted mountaineering club. He left me in disdain after I, an easterner, had confessed this serious shortcoming in my social standing. I continued my hike to a little falls about which one of my favorite Nature writers had written, and where he had said that there was a water ouzel's nest. I found the falls in safety, and, sure enough, the nest was there and I saw my first water ouzel. As I was looking, I was nearly struck by some falling gravel. Then down came some more gravel, followed by a cascading mountain hiker. He landed unhurt on the portion of his anatomy reserved for that purpose, but, when I laughed, picked himself up and limped down the stream without saying a word. Not once did he deign to look at the water ouzel's nest about which I had read thousands of miles away. Possibly a dipper's nest was an old story to him, but I rather doubt that he had any interest beyond trying to maintain his standing in his club. What I had seen of his ability to get about on the rocks hardly suggested high prowess.

I mention this incident because it illustrates a danger that arises if any lover of the outdoors lets himself become too much of a specialist. Possibly, I owe this viewpoint to my natural inclinations, but I am certain that such writers as Mills and Muir helped me confirm my convictions.

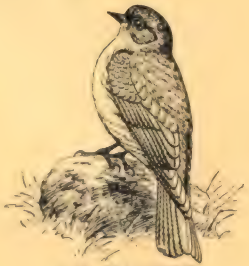
I have a dog-eared copy of Mills' *Wild Life in the Rockies* given me as a Christmas gift thirty years ago. It is from this book that I gained my first interest in such birds as the Clark's crow, Bullock's oriole, Arkansas kingbird, magpie, raven and other western species. I wanted to see them; and waiting a decade for the privilege only whetted my appetite to find something such as a water ouzel's nest.

Since that first visit to Eaton Canyon, I have seen many water ouzels; found their nests from Los Angeles north into Canada and east through Utah. I have never tired of watching and listening to them. They remind me of a Louisiana water thrush, which haunts a canyon near my home, but the ouzel excels the water thrush in every way. I remember how surprised I was to see an ouzel disappear under water in a swiftly-flowing stream and come to the surface at some relatively distant stone apparently none the worse for the experience. I do not see even now how it is done. Any bird that can perform a feat like that is entitled to be as vociferous as the water ouzel.

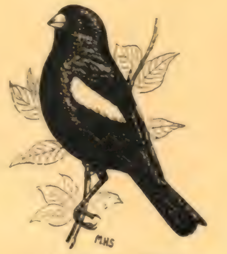
This series of inserts has already considered many western birds of the waterways and of the desert lands. The ninth, thirteenth and fourteenth inserts all had illustrations and life history material on western species of birds.



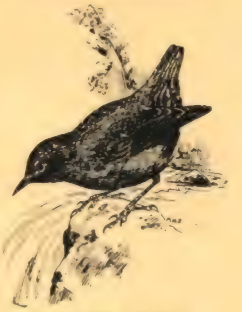
WREN-TIT



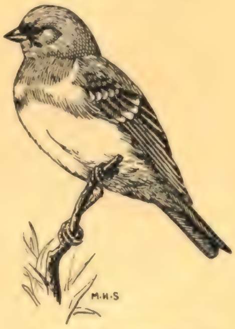
MT. BLUEBIRD



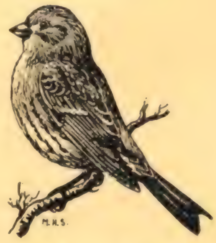
LARK BUNTING



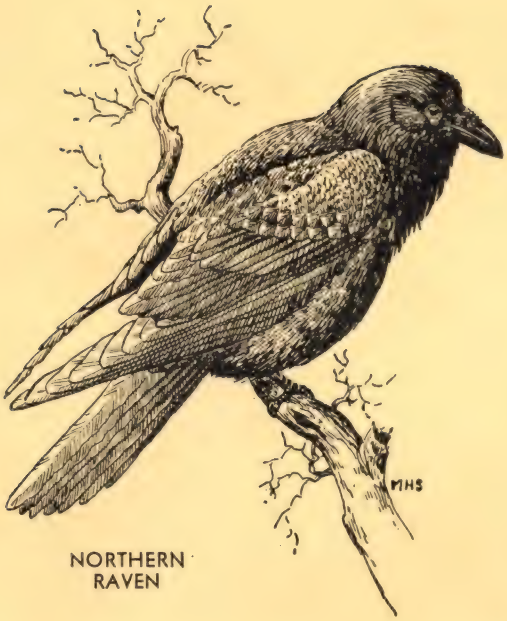
WATER OUZEL



LAZULI BUNTING

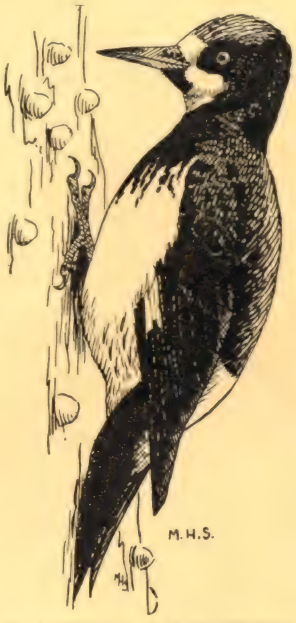


HOUSE FINCH



NORTHERN RAVEN

Since these units dealt with deserts, marshes and waterways, and with game birds, they failed, for the most part, to consider the birds that you and I would see and hear in the familiar fields and woodlands of the West. I have also applied a loose definition to "West", and have included some of the characteristic mid-West species that an easterner would notice on his way West.

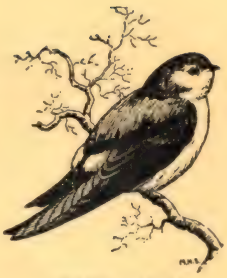


CALIFORNIA WOODPECKER

A rather close western relative of our water ouzel that startles an easterner is the wren-tit. I saw, heard and recognized my first of these birds in southern California. So loud was its call that it was hard to believe that such a small bird could make it. It behaves much like some of our more wary eastern wrens but neither the wren-tit nor the water ouzel belong to the wren family.

Another haunter of western brushlands is the lazuli bunting, one of our most beautifully-colored birds. This bunting favors open country where brush borders the brooks and the smaller, relatively slow-flowing streams. I got really acquainted with a lazuli for the first time in Utah. His behavior is something like that of the dickcissel of the mid-West, or, possibly, the indigo bunting of the East, and his song is something like that of the lark sparrow. But his appearance is his own, and once he has been seen well or heard distinctly he will be easily remembered. The lazuli is the sort of bird that an easterner sees pictured in the books and decides that the western artist who drew the picture must have been characteristically pepping things up a bit. All this is forgotten with your first real introduction to the bird.

Another western bird that one feels the artists must have overdone is the violet-green swallow, the bird that crashes the front page of the eastern newspapers once a year when it keeps its migratory schedule at the mission of San Juan Capistrano. This swallow lives in a great variety of places from Alaska to Central America, and, so far as I know, has not been found living, even accidentally, east of Illinois. It is a strict westerner and a westerner worth knowing.



VIOLET-GREEN SWALLOW

When you talk of an oriole in the West, you usually refer to the Bullock's oriole. While it builds nests somewhat similar to those of the Baltimore oriole, it cannot match the eastern bird in brilliance of color or in vigor of song. The first time I heard one I thought that it must be an oriole and yet could not be.

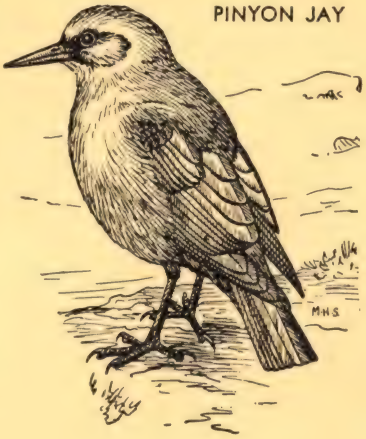
The Bullock's oriole lives in the same sort of places where man builds his home and raises his crops. Like man, he enjoys cherries, but unlike man he makes some nine-tenths of his diet of the insect enemies of plants. Obviously, his good deeds should be appreciated and his minor strayings from the straight and narrow path should be forgiven by the orchardist.

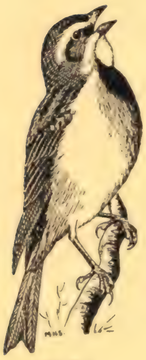
I saw my first house finch in the backyard of a Los Angeles home. At first I thought it was a purple finch such as I had left singing in my backyard a few weeks before. I learned, however, that the purple finch of the West is larger than this house finch and favors woodlands more than back yards. When you see a house finch out in the cactus land, however, you wonder how such a beautiful bird can sing so happily in a region that seems to offer so little to a bird.

The mountain bluebird is another bird that lives about the homes of westerners. Yet I spotted my first one from a train window in New Mexico. Somehow, it is usually either color or sound that fixes a bird in the memory, although with such as the roadrunner, it may be motion and form. The mountain bluebird I saw looked exactly like the pictures I had seen in the books so I was not particularly excited. No book could adequately picture the behavior of a road-runner, however, and I was glad I was in an observation car when I first spotted one.

I have been to the West Coast more than a score of times, and there is one bird that I always look for on the way—the magpie. The last one I saw coming east was in mid-Nebraska, but usually they are

PINYON JAY

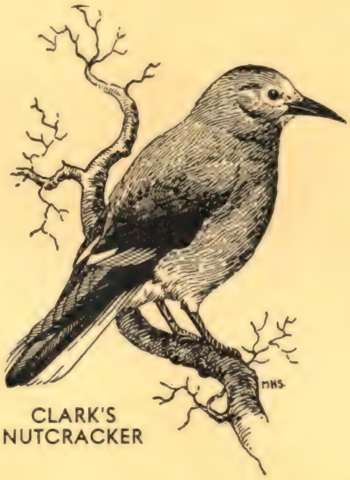




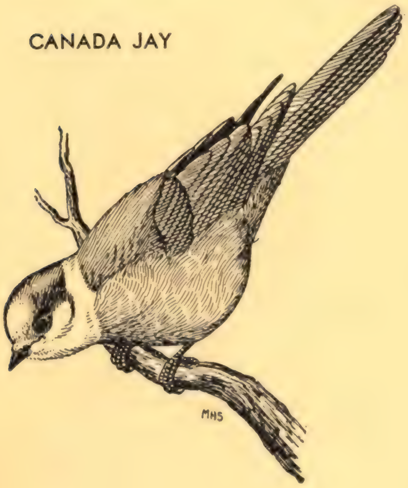
DICK-CISSEL

not common this far east. This is a bird whose behavior, coloration, voice and reputation all provide something about which people like to talk. There are those who swear eternal vengeance on every magpie they see. There are others who will interminably tell you of what their pet magpie did. Dr. Arthur A. Allen of Cornell brought one east with him a few years ago and it lived mischievously in the trees about his home in Ithaca until it got picked off one night by some enemy. One thing is certain, a magpie usually knows "what's cookin' " and is going to be in on the feast if it is at all safe to do so. Easterners headed west usually spot their first magpie tugging away at some jack-rabbit killed by a car on the highway. These birds are good judges of speed, and usually know just when to leave the feast to escape being hit themselves. Sometimes they waste little time getting back after the car has passed. Although I have seen a few of these long-tailed, black and white birds that have been killed by cars, they are the exceptions, probably young or very old birds either inexperienced or not on the alert for their safety.

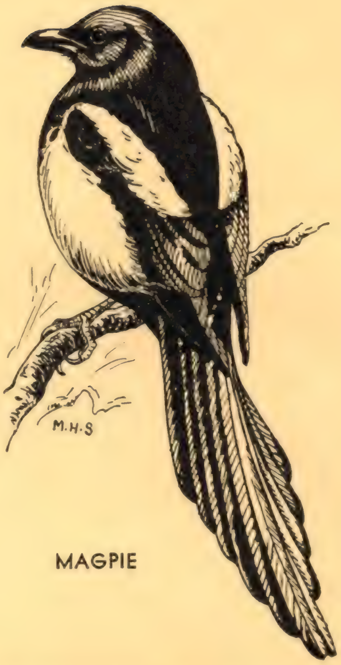
Of course, the magpie shares the fate of all scavengers, and since many magpies will gang up on young lambs or sick calves they undoubtedly deserve some of the bad reputation they have. Where they are too numerous, they must, of course, be controlled, but I hope the time will never come when watching for these birds on my way west will fail to be rewarded. Somehow, when you see the first magpie you give a good stretch and say, "Well, at last we are getting somewhere". The monotony of fine farms with rich corn and fat hogs and steers, such as characterize the Corn Belt, will begin to disappear with the appearance of the first magpie. There will be monotonous miles of sagebrush with no hogs and with gaunt steers ahead, but by the time they get to be too boresome you will be in wild country, and will have to be watching the turns and seeing who can first spot a snow-capped peak in the distance. After that, there will never be monotony. So probably the reason I welcome a magpie on my trip is that it holds a promise for better or different things to come.



CLARK'S NUTCRACKER



CANADA JAY



MAGPIE

The borderland of the West, where the magpies begin to appear, is not without its attractive and interesting birds. Here is the homeland and singing territory of the lark bunting with its conspicuous white wing patches; the lark sparrow with the white around the corners of his tail; the dickcissel that perches on the telephone poles and looks like a little meadowlark with his black bib and yellow breast. During the years that I lived in the middle West, I never tired of the dickcissel and the lark sparrow, and that was not because they were uncommon. Dickcissels are almost as common in Iowa as corn and hogs, and no one can suggest a better simile than that. Of the three, I think I enjoyed the dickcissels the most, even though the hogs and the corn helped pay my salary. Somehow, the lark sparrow and the lark bunting have never been able to compete with that little dickcissel, so I will leave him ruling the roost and deal with some other birds.

The Arkansas kingbird, with his white-bordered tail, lets an easterner know he is different from the eastern kingbird, with its white-tipped tail. An artist who wanted to draw a picture of a telephone pole with accessories that would indicate that it belonged in the middle West could do no better than show a nest of this kingbird at the top and a hole of a red-headed woodpecker in the side. The woodpeckers used to thrive in the horse and buggy days by having these nest sites erected for them, but with the advent of fast cars they are being wiped out rather seriously in spots. In my recent trips to the West, I have been more impressed by the scarcity of red-headed woodpeckers than by any similar decrease in numbers of the kingbirds. Possibly, this is because the red-head is more spectacular and would therefore be more likely to be missed.

Of course, the woodpecker we most commonly associate with the far West is the (Continued on page 168)

COMMON NAME **SCIENTIFIC NAME** **ORDER** **FAMILY**	**CALIFORNIA WOODPECKER** *Balanosphyra formicivora* **Piciformes** **Picidae**	**VIOLET-GREEN SWALLOW** *Tachycineta thalassina* **Passeriformes** **Hirundinidae**	**ARKANSAS KINGBIRD** *Tyrannus verticalis* **Passeriformes** **Tyrannidae**	**CANADA JAY** *Perisoreus canadensis* **Passeriformes** **Corvidae**
DESCRIPTION	Length, to 9 inches; wing, to 5.8 inches; tail, to 1 inch. Female, slightly smaller than male. A squarish, whitish or yellow patch is next to the red crown. Upperparts, glossy greenish. Female has a black band separating white of forehead from the red of the crown. When in flight, appears black and white, with large white rump and wing-patches. Markings indistinct in young.	Length, to 5 inches; wing, 4.7 inches; tail, 2 inches; bill, .2 inches. Female, smaller than male, length, 4.5 inches. Crown and head, bronze-green to purple bronze; wings, green with purple tinge; upper tail, purple; sides of rump, white; tail and wings, black, with blue gloss. Female, duller than male. Young, sooty brown above.	Length, to 9.5 inches; wing-spread, to 16.5 inches; tail, to 4 inches. Female, slightly smaller than male. In this species, white on tail borders sides instead of tip, so there should be no misidentification. Crown patch on female is smaller than that on male, as in eastern kingbird.	Length, to 12.1 inches; wing-spread, to 17.5 inches; tail, to 6.3 inches. Female, smaller than male. Appears in field like large gray bird with dark cap, white throat, inquiring nature, lots of nerve and, somehow, a sense of humor. Young, are dark, slate colored. Sexes, colored alike.
RANGE AND HABITAT	Five subspecies recognized to include: the Ant-eating, the Mearns, the California, the San Pedro and the Narrow-fronted Woodpeckers. Range covers the southwestern United States, from Oregon to Texas and, with some subspecies, south through Mexico; with related species, into northern South America.	Breeds, from central Alaska to central Alberta and south to northern Lower California and northern Durango, and east to western South Dakota and Nebraska. Winters, in Mexico and south to Guatemala and Costa Rica, going through western Texas in migration. Accidental in Illinois.	Breeds, from southern British Columbia to Minnesota and south to northern Lower California, Chihuahua, and western Texas. Winters, from western Mexico to Nicaragua. Occasionally, found in Massachusetts, New York, Florida, Virginia, South Carolina, Maryland, Maine, Michigan, Wisconsin and Illinois.	Three subspecies include; the Canada, the Rocky Mountain and the Alaska jay. Canada jay breeds from Alaska and northern Mackenzie to Labrador, and south to central British Columbia, northern Minnesota, northern New York and farther south in high mountainous areas. Rocky Mountain jay ranges south to Arizona and New Mexico.
REPRODUCTION	Nests, usually, in a hole, in white oaks, but also in pines, cottonwoods, black oaks and other trees. Hole, usually 6 to 18 feet from ground. Eggs, 4 to rarely 6, white, with little gloss, 1 by .8 inches. Incubation, by both parents, 14 days. Sometimes, 2 females use same nest. Young, blind when hatched. Juvenile feathers molted second fall.	Nests, in cliffs, old woodpecker holes, and in hollow trees. Nest, with a lining of grass, and an inner lining of feathers. Eggs, white, 4 to 5. Incubation, probably as with other swallows. In Oregon, the violet-green swallows seem to take readily to nesting boxes and are not infrequently found in attics and abandoned houses.	Nest, placed on branch of tree like that of eastern kingbird, or on crossbars of telephone poles. Eggs, 3 to 5, like those of the eastern kingbird but slightly smaller. Incubation, by both sexes, for 12 to 13 days. Both parents assist in the rearing and protection of young. Annual broods, 1 or 2.	Nests, mostly in coniferous forests, often in wooded swampy areas. Nest, large, relatively neatly built, of twigs, lined with grass, mosses and soft lichens. Eggs, 3 to 5, grayish, or with yellowish tinge, 1.21 by .88 inches. Incubation, from 16 to 18 days. Annual broods, one. Commonly travels in pairs. Breeds very early in spring.
FOOD HABITS	Food; chiefly acorns, rarely fruit and sap. Acorns are stored by being driven into holes in outside of trees, often sufficiently to cover wide area. Acorns are driven into crevices to be held for opening; the feet not used for holding food. Sometimes, as many as 1500 acorns stored on one telephone pole.	Food; is practically 100% insects. Bugs make up one-third of the food, with leaf hoppers being an obvious favorite. Wasps and wild bees, constitute one-sixth of the diet; beetles, about one-tenth and ants slightly less. The migration is leisurely in the fall but en masse in the spring.	Food; known to be 90% insects; the remainder, mostly wild fruits and seeds. The food is, for the most part, caught on the wing. The number of beneficial insects found in 109 stomachs was too small to have any significance.	Food; will eat almost anything that can be considered as edible, cleaning up garbage about camps, eating fish, eggs, meat, soap, toothpaste and great quantities of insects. Stomach of one bird had approximately 1000 tent caterpillar eggs in it. Also eats mice and beetles.
RELATIONS TO MAN	Probably not important economically. Rare cases of eating eggs of other birds; frequent cases of mutilating trees, and wholesale cases of destroying acorns not to the bird's credit. Rumor that only injured acorns are eaten are not well founded.	Its use to man should be obvious by an examination of its dietary habits. Few birds can equal or excel its beauty either while perched or when in flight and its food habits are exemplary so far as man's interests are concerned.	The species is undoubtedly one of the most useful species of birds in its range. It is entitled to every possible protection, from federal, state, and from private sources. The bird should be studied more in schools than seems to have been the case.	Always an interesting bird about camp, even if it is mischievous and sometimes annoying. Those who have studied it most carefully and impersonally claim that, in general, the bird is highly beneficial though in individual instances this might be highly controversial. Called Camp Robber and Hudson Bay Bird.

AMERICAN MAGPIE *Pica pica* **Passeriformes** **Corvidae**	**NORTHERN RAVEN** *Corvus corax* **Passeriformes** **Corvidae**	**PINYON JAY** *Cyanocephalus cyanocephalus* **Passeriformes** **Corvidae**	**CLARK'S NUTCRACKER** *Nucifraga columbiana* **Passeriformes** **Corvidae**	**WREN-TIT** *Chamaea fasciata* **Passeriformes** **Chamaeidae**
Length, to 21.7 inches; wing, to 8.4 inches; tail, to 11.9 inches, bill to 1.4 inches. Weight, 5.3 ounces. Nostrils, covered with bristles. Extremely long tail that tapers, half its length; conspicuous black and white markings serve to identify. Sexes, colored alike. Young, with usual glossy black areas, dull black.	Length, to 26.5 inches; wing-spread, to 56 inches; tail, to 10.95 inches; bill, to 3.25 inches. Female, smaller than male. Black all over. Nostrils hidden by bristle-tufts. Tail appears rounded at the tip, when bird is flying; and size is such that it should not be confused with smaller crow. Sexes, alike. Young, like adults.	Length, 11.7 inches; wing, 6 inches; tail, 4.8 inches. General color, a grayish blue. In flight, shows relatively short wings and nearly square-tipped tail. Throat and chest are gray streaked. Female resembles male but is slightly smaller and duller. Young are duller yet, with blue only on the wings and tail.	Length, to 13 inches; tail, to 8 inches. Face, white, and rest of body gray. Central tail feathers, black, but rest of tail, white, above and below. Wings, glossy black, but secondary feathers are white-tipped. Sexes, colored alike. Young, with gray paler; and breast, apparently more spotted.	Length, to about 7 inches, with upper parts, brownish olive, and the lower parts, pale cinnamon, yellowish brown. Tail, wren-like, and bill, long and curved, like that of wren. Crown, hindneck, wing and tail feathers, grayer than other parts; sides of head and neck, grayish olive. Iris, white. Sexes, colored alike.
Breeds, from Alaska Peninsula, southward, mainly near the coast, to southern Manitoba, south through eastern Washington and eastern slope of Sierra Nevadas, to Arizona and northern New Mexico, east occasionally, to Iowa, Wisconsin, Illinois, Michigan, Ontario, Hudson Bay, and even Quebec. Related yellow-billed magpie, now restricted to southern California, found in California Pleistocene.	Two subspecies, the Northern and the American raven. Northern, breeds from northwestern Alaska to Greenland, and south to the States of Washington, Minnesota, Virginia and in parts of Georgia. American, ranges from southeastern British Columbia to North Dakota, and south to Nicaragua. From California Pleistocene.	Resident from central Washington to central Montana and south to northern Lower California and northwestern Nebraska. Sometimes found on the California Coast and sometimes as far east as eastern Nebraska and Kansas.	Breeds, from southern Alaska to South Dakota, and south through the mountainous areas to northern Lower California, Arizona and New Mexico. In winter, moves farther southward. Occasionally, found in western Nebraska, Missouri, Arkansas, Iowa and Wisconsin.	Five subspecies include; the Coast, the Ruddy, the Gambel's, the Pallid, and the San Pedro Wren-tits, which, in the aggregate, range from the Columbia River in Oregon to the Mexican border in the humid areas to the west of the mountains. They favor cover for the most part.
Usually, lives in colonies or nests in colonies in thickets or trees. Nest, size of a bushel basket, of twigs and dry plant material, with a good lining, sometimes cemented with mud, and with a lateral, covered entrance. Eggs, 7 to 10, grayish or green, dotted, dashed and blotched, with purple or brown; .34 ounces. Incubation, 18 days.	Nests, usually in forests or along the seacoast. Nest of coarse sticks, lined with finer plant material, in a tall tree, or on a rocky cliff. Eggs, 5 to 7, pea-green or olive, with spots of brown, gray or lavender, 1.95 by 1.4 inches. Incubation, 20 to 21 days, by both sexes. One annual brood.	Nests, in colonies, in pinyon pines, junipers and oaks. Nest, deep, bulky, compact, with well formed inner cup, 5 to 12 feet from the ground. Eggs, usually 4 to 5, bluish white, spotted or streaked with brown, or sometimes blotched. Birds stay in pairs even though great numbers nest and feed at common points.	Nest, built in coniferous forests; a platform of twigs, bound with bark, grass and needles; sometimes lined with wool, quilted together to form a mat. Eggs, 3 to 5, pale, gray green, sparsely flecked or spotted with brown, gray or lavender, particularly at the larger end. Incubation, 16 to 22 days. May nest in zero weather.	Nest, in low bushes or trees, rarely if ever over 4 feet above the ground. Nest, made of woven grass, bark, roots, and other vegetable materials, usually lined with hair of horses or cattle. Nest, generally well hidden from prospective enemies. Eggs, 3 to 5, but usually 4, pale bluish green.
Food; grasshoppers, large black crickets, ground beetles, codlin moth larvae, rodents, carrion. Eighty-five kinds of plants and animals recognized in stomach contents including reptiles, amphibians, worms, birds, crustaceans, spiders and scorpions.	A useful scavenger, killing great numbers of mice and rats and injurious insects, but may also destroy young lambs, chickens and even attack weak and injured animals of larger size. Shows exceptional cleverness in outwitting more powerful animals, particularly where a number of ravens work cooperatively.	Food; chiefly nuts of the pinyon pine in season, but also seeds of yellow pine, black pine, juniper berries, wild berries; and insects, such as grasshoppers. Injury has been caused by these birds to some growing crops such as grains and even watermelons, particularly where the birds act in unison in flocks.	Food; in summer, nut-like seeds of certain pines, the berries of cedar, beetles, caterpillars, grasshoppers and destructive black crickets of their range. In fall, food is essentially, nut-like fruits of pines. Young fed hulled seeds of pine, regurgitated by parents.	Food; essentially insects, gleaned from the cover in which the bird so easily disappears, but from which it is so frequently heard. Only family of perching birds with representatives to be found only in North America—and this is confined to a relatively small part of continent.
As an insect eater, it has no related superiors; as an enemy of rodents it is excellent. It, however, robs nests of domestic poultry, kills young chickens. It attacks newly-sheared lambs, sick or wounded cattle and by its incessant chattering annoys many people. It undoubtedly is a pest where its numbers are large.	Because of destruction of live stock and poultry where ravens are abundant, their numbers have been greatly reduced; and over much of their original range, they may no longer be found. Certainly great flocks comparable to those of crows no longer exist near intensively cultivated areas.	Undoubtedly, where flocks of these birds congregate near cultivated lands bearing crops or newly planted crops, they may cause much injury. However, it seems that in general they are easily and effectually frightened away by scarecrows and by a little shooting.	Interesting birds about camps, but rather too noisy and inquisitive for their own good. May destroy baits on trap lines and win hatred of trappers. Common and welcome about many of National Parks where they may come to feed out of hand, in competition with ground squirrels so popular with most people.	Probably, useful as insect destroyer, but more useful in confounding naturalist who feels confident that it will be easy to locate a bird capable of making such a loud commanding sound. These birds are common about San Francisco Bay area and invite plenty of inquiry by naturalist visitors to region.

LAZULI BUNTING *Passerina amoena* **Passeriformes** **Fringillidae**	**HOUSE FINCH** *Carpodacus mexicanus* **Passeriformes** **Fringillidae**	**LARK BUNTING** *Calamospiza melanocorys* **Passeriformes** **Fringillidae**	**LARK SPARROW** *Chondestes grammacus* **Passeriformes** **Fringillidae**	**DICKCISSEL** *Spiza americana* **Passeriformes** **Fringillidae**
Length, to 5.5 inches; wing, to 3 inches; tail, to 2.3 inches. Female, slightly smaller. Adult male, with upperparts turquoise blue, varying to greenish blue; two white wing bars; breast and sides, brownish but other underparts, white. Female brown, sometimes streaked; rump, greenish blue; chest, brownish and belly, white.	Length, to 6.1 inches; wing, to 3.3 inches; tail, to 2.6 inches. Weight, .66 ounces. Female, about .5 inch shorter, with tail and wing about even in length; streaked gray and brown all over. Adult male, rose-pink throat, rump; line over eye; back which is not sharply streaked; belly, whitish; wings and tail, brown streaked.	Length, to 7.5 inches; wing-spread, to 11.5 inches; tail, to 3.35 inches. Weight, .95 ounces. Temperature, 101° F. Male, like a small, sparrow-sized, blackbird with large white wing-patches. Female, young, and male in autumn, brown, with breast stripes, and conspicuous white wing-patches. Not easily confused with other birds because of wing-patch.	Length, to 6.75 inches; wing-spread, to 11.1 inches; tail, to 3 inches. Female smaller than male. Temperature, 110° F. Conspicuous in field because of white around sides and corners of rounded tail. Shows chestnut patches on sides of head and white breast with one central dark spot. Young birds have streaked breasts, without central spot.	Length, to 7 inches; wing-spread, to 11 inches; tail, to 2.9 inches. Female, smaller than male. Male, like diminutive meadowlark showing usual black bib and yellow breast. Female, paler than female English Sparrow, with yellow breast, chestnut on bend of wing and white stripe over eye.
Breeds, from southern British Columbia to southeastern Saskatchewan and northwestern North Dakota and south to northwestern Lower California and west central Texas. Winters in Mexico south to the Valley of Mexico. Accidental, in Minnesota and southern Mackenzie.	Three subspecies; the Common, the San Lucas and the San Clemente. The common house finch breeds from Oregon and Idaho through northern Wyoming and south through California and New Mexico, Lower California and Mexico to northern Chihuahua. May extend range east to western Kansas and western Texas.	Breeds, from southern Alberta to southwestern Manitoba and south to southeastern New Mexico and northwestern Texas and east to eastern Nebraska and west-central Minnesota. Winters, south from southern Texas and southern Arizona to Sonora and southern Lower California. Accidental, in New York, Massachusetts and South Carolina.	Two subspecies; the Eastern and the Western Lark Sparrows. Eastern, breeds from eastern Nebraska through western Minnesota to southern Ontario, to southern Louisiana, West Virginia and Maryland. Winters, southern Mississippi, southeastern Texas and eastern Mexico. Western, extends range to British Columbia and south to Guatemala.	Breeds, from northeastern Wyoming to southeastern Ontario and south to southern Texas and northern Georgia. Formerly it bred through to the Atlantic plain; now rare east of the Alleghanies. Winters, Guatemala to Colombia, Venezuela and Trinidad, migrating through Central America and Mexico.
Nests, usually near water in low bushes, among weeds, in willows, manzanitas and rose bushes. Nest made of plant fibers including bark, and often lined with hair or other fine materials. Eggs, 3 or 4, plain, bluish white or pale greenish blue, sometimes spotted.	Nests, in bird boxes, sagebrush, saltbush, mountain mahogany, cactus, tree cavities, buildings or on tree branches. Nest, shallow cup of grasses, hair, string and wool. Eggs, 3 to 6, bluish or greenish white, with spots, dots and blotches of black or brown near larger end; egg-weight, .08 ounces. Temperature, 106 degrees to 108 degrees F.	Nests, on ground, in open plains and prairies. Nest, often sunken in ground, made of grasses and lined with hair, plant down, or fine grasses. Eggs, 4 or 5, light greenish blue, rarely sprinkled with reddish brown spots. Egg-weight, .1 ounce. Incubation, by female. Annual broods, one or two. Male loses black after nesting season.	Nests, in open fields and prairie lands. Nest, on ground or in low bushes, made of grasses, and lined with fine rootlets or long hairs. Eggs, 3 to 5, white, pinkish, or grayish spotted, streaked and blotched with brown, black or purple; egg-weight, .1 ounce. Incubation, about 12 days, by female.	Nests, in fields and meadows as does the Meadowlark, and perches on nearby trees, posts or wires and sings as does the Meadowlark. Nest, on ground, among grasses or in low tree or shrub; made of grasses. Eggs, 3 to 5; greenish blue, .8 by .6 inch. Incubation, by female, 10 or 11 days. Probably, two annual broods.
Food; mostly weed seeds and noxious insects, the latter including alfalfa weevils and codlin moths. In habits, the bird reminds one of the Indigo Bunting found to the east of the Lazuli's range. The blue back of the male, flashing from the top of some weed or from the edge of a thicket, tempts one to seek the nest.	Food; 97%, vegetal, with less than 1% being grain. Common seeds eaten include; Russian thistle, dandelion, sunflower, mistletoe and, unfortunately, some cherries, mulberries and serviceberries. If serviceberries and mulberries are planted near cherry orchards, they may draw the house finches from the cherries. Song, ecstatic and worthwhile.	Food; largely seeds of weeds, grass and grain. Of its animal food, 78% is grasshoppers, though it includes also leaf-beetles and weevils. Of the seeds eaten, the important ones are Russian thistle, pigweed and amaranth, all prominent and pernicious in the range of the bunting.	Food; about half plant, and half animal matter, the animal matter including grasshoppers and locusts particularly in season, and the plant material made largely of weed seeds. Some grain is eaten as would be expected of such a large sparrow but much of the time after breeding season is spent in borders, not in open fields.	Food; mostly insects, weed seeds and a little grain. It is estimated that one family of Dickcissels eats 200 grasshoppers in one day and each grasshopper eats 1.5 times its own weight in plant material. The song, "Dick-dick-dick-cissel" is repeated again and again by the male during the nesting season.
It is no wonder that, within its range, the Lazuli Bunting is popular with those who love birds. It is surprising that this popularity has not found expression in its being considered as important enough to be a State Bird. It has more beauty than many birds so elected.	Essentially, the bird is useful as a weed seed destroyer, but also as a beautiful bird with a splendid song living in a place not always attractively populated. Its presence is considered by some as a good index of nearby water and in deserts, this may have a real significance to man's interests.	The bird does some harm to growing grains and may take some toll from harvested and waste crops but this is probably more than offset by the good done in destroying weed seeds and insects. This is the State Bird of Colorado.	An attractive sparrow, holding our attention because of the flashing white on the relatively long tail. In a sense, the bird seems something like a towhee that lives in the open. One never forgets the first nest he finds of a lark sparrow.	This bird means the Mid-West to the writer. It and the red-headed woodpecker populate Iowa's telephone poles clear across the State. It is estimated that the species saves the State of Illinois $4,680 a day during the nesting season by the insects destroyed. Long may it live to maintain its record.

(Continued from page 163) California woodpecker. Having read of this bird, and having seen it pictured long before I ever saw it alive, I was not so startled as I might otherwise have been to find it on a tree that seemed to have acorns imbedded in the side. The bird makes an easterner think of a combination flicker-red-head-sapsucker all thrown into one. It has some of the qualities of each of these woodpeckers but certainly differs greatly from each. One of the first motion pictures I ever took was made of one of these birds in the San Francisco Bay area. I blessed the bird because it posed so well. My experience before had been that as soon as I got ready for a bird picture, the bird had gone elsewhere. Not so the California woodpecker, who seems to wish to be sure that the easterner will take back a record with him.

Let us now be off to the woods to see what the West offers there. The jays seem to claim the spotlight whether you are in the National Parks crowded with other easterners, or in some peaceful out-of-the-way place. At Crater Lake, the jays almost demand that a visitor take their pictures. It is more likely that they are demanding that you buy some peanuts to feed them, but anyway they pester you. You buy the peanuts, and you are lucky if only one camera is not pointed at you while you feed them. The Clark's nutcracker, or Clark's crow, is the bird that haunts the Crater Lake hotel so persistently. The pinyon jay, Clark's nutcracker and the Canada jay all belong to the same family, as do the crows and ravens. The Canada jay extends its range much farther east than do the pinyon jay or the Clark's crow. In the lumber camps of Michigan and in eastern Canada, this bird is known as the camp-robber, and the name is entirely appropriate. Most of the jays interest the tourist because of their loud calls and inquisitive ways. Some display beautiful colors, but in this respect they hardly rival the ordinary bluejay of the East. But to the resident westerner, jays are not always just noisy, inquiring, or comical birds. They may be downright nuisances. Worse than that, when a flock of them starts to get filled up on growing watermelons, the land owner is likely to use the same techniques for protection that he would like to use on humans who assume similar liberties. In spite of the reputation the jays have for intelligence, they are usually more easily frightened from fields of growing food by the use of scarecrows than are our crows.

I suppose that I should be a rational human being, and wish for the elimination of those kinds of wild life that may destroy the fruits of man's labor. I cannot, however, be so deliberately practical as to wish for the day when I can go across this continent and never see a jay, or for that matter not see *many* jays. I doubt if I will ever have to face this situation because the jays, like the crows, seem able to survive persecution. To be sure they hardly thrive on it, as do the crows, but they seem well able to take care of themselves. Perhaps Nature planned it that way for them.

The raven is of course another member of the crow family to be found in the West, sometimes in real abundance. You never forget the first one you see. Its tail is rounded at the tip when the bird is flying and the size is so much greater than that of the crow that you need never make a mistake.

I think it was Samuel Scoville, Jr., who once wrote that if you had a hunch that the bird you saw was a raven then it was a crow, because if it were a raven there would be no question about it in your mind. I am sure that Scoville's essay on his search for a raven's nest in Pennsylvania was one of the things which prepared me for my first raven. If you have not read it, do so.

But the ravens I have seen in the West are much different from those Scoville describes. Somehow, I associate them mostly with the cut-over part of the State of Washington, where snags and windfalls and devil's club make trout fishing almost an impossibility. You spend hours trying to get over, or through, or under a "jack-straw" pile of Douglas spruce logs while you drag along a camera, fish pole and pack basket. You look back along the trail you have come and figure that in a day or so you might be able to go another hundred yards or so if you have luck. Then, in a moment of despair, you look up. There sailing along serenely in the sky is this huge black bird. In a few seconds, he covers twice the territory you have covered in the last hour. You get so disgusted with your own ability to get about that if you had a gun you probably would shoot the raven just because you are so jealous of him.

When you get back home, comfortably bathed, shaved and rested, with a good dinner under your belt, you look back over the last day or so. Somehow, that raven sailing through the sky stands out as one of the bright spots of your trip. A crow, or a flock of blackbirds, could never have raised a similar response. Anyway, I can remember an experience such as this that I had the last time I was in Washington. And if you would ask me how many trout I caught that day or how big the biggest one was I could not tell you to save my soul. I have often wondered what that raven thought of me and what I was trying to do. I could see him turn his head and look down on me as he sailed by. I know what my opinion would have been of him if our positions had been reversed. For that matter I wonder always what the other fellow thinks of me.

I know that I, an easterner, get a great kick out of knowing western people and western birds. I only hope that they get half the same amount of pleasure from knowing me and knowing eastern birds. One thing is certain. As soon as the opportunity presents itself again I am off to renew my acquaintances in the West. And I will be looking for the first magpie in Nebraska, and the last dickcissel in the middle West, and the first of each of the other birds considered in this insert. They happen to be favorites of mine. I hope that they may be favorites of yours also.

As We See It

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Conservationists — Why Have We Failed?

An Editorial by Arthur Newton Pack

We have recently read a statement by a man who is widely known in the field of conservation, and this is, indeed, a bit of vitamin-enriched vinegar. He boldly, and quite truthfully, declares that most of the boasted conservation activities of our various organizations up to date are pretty badly over-rated. Granting good intentions and excellent aims, he says that we have really gotten nowhere toward the main fundamental objectives. Says he: "After all these years of effort to find some formula of conservation which would work, I am convinced that until a new generation is taught in the public schools man's utter dependence upon natural resources, until the teachers of Botany, Chemistry, Biology and Geology emphasize the functions rather than the terminology of their respective sciences, until, in fact, we have a majority of the American public schooled in the fundamental principles of conservation, criminal waste will continue to reduce our heritage of natural resources."

With all this we are in full agreement and we will go along with him in admitting freely that, in spite of our efforts and those of countless others, conservation is not yet being properly taught. We have failed.

We have failed, just as civilization has failed in Europe and Asia, just as Hitler and Hirohito will surely fail, because we and they have carelessly or deliberately ignored the fundamentals upon which conservation teaching—or any national existence upon this earth—must be built. In conservation as in world politics the only successful foundation lies not in the forceful imposing of crack-brained or even truly idealistic planning by some one individual or small group, but in preparing the young generation to think honestly from the beginning—not merely about the soil, plants, animals or economics, but about Life itself and the student's relation to his fellow men. Education in the present generation has not lived up to this duty. The attitude of leaders and teachers of conservation has been that of the parent who merely tells the child not to gobble up the candy in front of him but to save it for some other time. We have tried to define conservation as not killing the goose that lays the golden eggs but feeding her to the end that she may produce more gold. We have marshalled all the practical and worldly-sounding arguments that we could think of, and they have been rejected. Why?

Our arguments are of little avail because it is too often evident that conservation does not necessarily yield golden eggs to those who practice it, but more often calls for sacrifice that is in actual conflict with immediate self interest. What is it that destroys our soil, that drains swamps and kills waterfowl, that devastates the forest beyond chance of reproduction, or dams the river in such a way as to destroy fish and marine life? It is *not* simple ignorance of the value of our natural resources. It is largely the sheer power of self interest, local opportunism and overwhelming desire to grab while the grabbing is good. All the scientific teaching in the world will not stop this sort of thing unless men can first be taught to believe truly in something that is greater than the amount of money they can make, unless a new generation can be taught to place the welfare of all men above their own gain. So long as personal self-interest and group self-interest remain the chief forces that motivate mankind, it will be impossible to teach conservation any more effectively than in the past. So long as our homes and schools fail to inculcate in the new generation first of all a different attitude toward life, an idealism in relation to society and their fellow men, conservation has no chance of success against the laziness and opportunism of present and personal convenience.

Whether we call it practical Christianity or the Golden Rule, divorced from any particular form of religion, the fact remains that without the foundation offered by acceptance of the simplest teaching of love for one's fellow men, conservation simply cannot succeed. If we try to maintain otherwise, we are, in plain language, simply kidding ourselves. No generation brought up without far more general acceptance of Golden Rule idealism as a fundamental philosophy of human existence will ever fully accept the idea of conservation, any more than it will achieve a lasting world peace.

In the holocaust of destruction that is now sweeping the world, in the plans for winning the peace that must follow, forward-looking people are today beginning to realize that a good and workable civilization can be built only upon a changed individual and personal attitude of men toward their fellows, wherein education will teach first the rights of all men and the application of respect for one's neighbor—be he living or yet to be born. It will no longer be possible to sidetrack the ethical problems to the exclusive realm of religion. It will no longer be possible to relegate the practical principles of Christianity to lip service and to a comfortable toleration that excludes it from personal application to business, politics and even social experiments. For without it we will find it impossible to rebuild a practicable, workable world.

Conservation and world peace alike have their roots in the right kind of education—education that must hereafter place far more stress than formerly upon the fundamental social and moral values, which alone can uphold civilization. This leader is right in placing his faith upon teaching a new generation man's utter dependence upon natural resources, but that is not enough. We will never get the lessons over until we first teach the broader outlook of man's dependence upon respect and love for his neighbor, so that his neighbor's interests may be placed on a par with his own. When men so regard each other, conservation will be accepted as a matter of course and its principles will be so readily understood that only its scientific methods will need to be taught. Only then will the conservationist no longer be regarded as a crank, but of one piece with all those who are trying to bring peace on earth and good will toward men.

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Ring-necked Pheasants

By Joel W. Hedgpeth

The other day, in the hunting and fishing column of a daily paper, there appeared this item: "Of course, we had a great day. Plenty of the old ringnecks were accounted for, and the best deed we could pat our ownself for was the kill of the largest white-striped-back 'kitty' that we have ever seen. It had evidently grown to great health and size through a diet of pheasant eggs and the chicks of the birds." Perhaps it is unfair to single out such an egregious remark as this as a characteristic utterance, but it does reveal the type of mind all too frequently turned loose with lethal weapons upon the unsuspecting wildlife population.

No one will deny, of course, that the ring-necked pheasant is a handsome, delicious bird. Let us not forget, however, that it was introduced into this country for the purpose of being shot at, and because our own upland game birds were no longer plentiful enough to satisfy the growing population of hunters. In some parts of the country it is already showing a tendency to become a pest, and it is possible that some day its importation may be regretted.

As for the humble skunk, he is a native American, protected in all but a dozen states by closed seasons, and is one of our most valuable fur animals. Efforts of government scientists and Nature lovers to convince farmers that the skunk eats more bugs than chicken eggs have not been too successful. But the skunk does his best, and should he take to pheasant eggs there may come a day when the farmers will think very highly of him indeed.

This is beside the point, for by his own admission our proud and self-righteous columnist made no attempt to prove whether or not his skunk had attained that prime size on a diet of pheasant eggs and chicks—he just shot him dead and left him to rot. This is needless waste of a prime pelt, excusable in a small boy who has not yet learned better, but unforgivable in a person who finds himself in a position to boast of such an act in public print.

The whole problem of hunting and predation is too complicated to be dismissed by the shooting on sight of any animal capable of killing something before our hunting friends have a chance to kill it themselves. Too often the innocent die instead of the guilty; thousands of broad-winged hawks and barn owls die every year because "hawks and owls kill game birds," while animals who were formerly good citizens have been forced to levy on the pampered fauna of the barnyard, or the hunter's chosen prey, because of the destruction of their original food by hunting or by settlement, with its manifold by-products.

There are too many victims of self-elected "conservationists" left to rot in the fields and woodlands—and, it might be mentioned, too many maimed hunters, bystanders and livestock animals every season. Certainly some of this needless slaughter could be eliminated if something more than the ability to pay a license fee were required of hunters. A hunting license is one of the few privileges that can still be obtained without any further qualification. Yet a simple examination, requiring the ability to recognize common birds and mammals and an understanding of their interrelationships, as well as a demonstration of competence with firearms, would be no small contribution towards an increased understanding of conservation problems and a reduction in the unnecessary murder of innocent bystanders, human or otherwise.

Nature in Print

By HOWARD ZAHNISER

Felix Salten, whom American readers know as the author of *Bambi,* an honor that cinema audiences may be prone to ascribe to Walt Disney, wrote for the recently issued biographical dictionary called *Twentieth Century Authors* a brief sketch that included the declaration: "I am an observer, and have no head for philosophy." His latest work to appear in English, under the title *A Forest World,* has, however, so many philosophical implications—or so many opportunities for inferences—that the thoughtful reader is indeed persuaded that Felix Salten has at least a practical regard for the wisdom that may come along with much observing.

When an author who has lived for more than his threescore years and ten writes from Zurich, Switzerland, as a refugee from the Nazi persecutions of Jews in his Austrian homeland, a book that includes the exclamation, "I thank God for this little world unto itself, this forest world of mine, and all its free and lovely creatures," even though the words come as from a character of fiction, it is surely an inadequate appreciation to value the book as merely a tale that is told.

It is an intriguing tale—not only of wild animals in a forest, a sanctuary, but also of domestic beasts quartered at the forest's edge, and of their human keepers—the old forester Peter, his wife Babette, and their master, the hump-backed Martin. Isolated as a schoolboy by the mockery that his deformity provoked, Martin had withdrawn to "this little world" and had there achieved a happiness. "He understood the language of the trees no more than he understood the speech of the animals. Yet he had an instinctive feeling of oneness with other forms of life." And this feeling was for him a secret of happiness.

There are three readings, or interpretations, of *A Forest World.* First of all the tale itself carries one to the book's end. Events that happen in the forest, those of the barnyard, and still others as cat and donkey find adventures in the forest, or doe and fawns find refuge in the barnyard, are indeed of interest merely as narrative.

There is, however, a second reading in which the relationships among man, domestic animals, and wild creatures are in the center of interest, an interest rich in reward for the explorer who can benefit from Felix Salten's observings and ponderings. *A Forest World* would have illuminated the recent "Battle of Bambi" fought among those concerned with the reflections on man as a sportsman-hunter perceived in Walt Disney's production. We can appreciate other relationships more precisely when we visualize the fox exclaiming to the donkey: "You fool! You stupid grass-eater. Don't you know what hunger is?" And we can, of course, understand the words of the mare: "All our misfortune comes from their not understanding us and our not understanding them." There is, however, no disregard by Felix Salten of the realities involved in the opposition between "kill or be killed" and "live and let live." His novel is a reasonable introduction to a better understanding of life, and it may well be read, as are many more pretentious novels, for such a purpose.

Still a third reading of *A Forest World* may seem to make of this tale a fable, the philosophy or interpretation of which is probably best held sacred as between the reader and his author—not for formal statement in ways more explicit than those chosen by the fabulist himself.

"The stallion as usual lost patience first. 'Describe this freedom to us.'

"'I can't. To know it and understand it, you must live in freedom from your first day on earth.'"

A Forest World may tell of a "little world unto itself", and again it may concern the universe in which we all must live. In any case the possibilities have made three readings of the book interesting and satisfying for at least one person.

It has been interesting during these readings to be enjoying at the same time Louise Dickinson Rich's *We Took To the Woods,* the engaging success story of a woman who found that life was not only endurable in what many would call the isolated Maine woods, but also more satisfying than near the congested centers of the civilization of which in many ways she is very much a part. There is an atmosphere of adventure in this account of how Mrs. Rich realized a girlhood ambition to live in the Maine woods and write. The happenings it chronicles are rich in human interest and about them the author discourses eloquently. And with frankness she makes it apparent that she considers herself no Thoreau carrying out an experiment with social implications, but simply an individual character who loves her way of life, her family and friends, the domestic requirements of living, and her writing. Surely to her great gratification now, her writing—flowing easily as though in a conversation—has through this book made her known to readers throughout the country, not essentially because of its setting but because of its first-person revelation of the details of

(Continued on page 218)

The good earth has a big job to do for 1943, and so have home Victory Gardeners, with whom it is—

Accent on Food

By ANDREW S. WING

Secretary of the National Victory Garden Institute and Garden Editor of Nature Magazine

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Jimmy Barry of McIntosh, Florida, is proud of what he raised in his plot in the school garden to help in the food problem.

PERHAPS you have not yet completed your garden plans for this year; or, perhaps, you have been wavering in your decision about planting a food garden. It is not too late, even in the South. And do not forget that, while last year it was prudent to plant food gardens, this year it is a wartime necessity. No one with the land, time and strength should shirk this responsibility. Self-preservation is a mighty strong reason why. As for flowers in the garden, give them their place, but for 1943 the accent is on food.

What to plant in the kitchen garden will depend on several factors, including the size of the plot available and the preferences of the family. You might as well feed your garden crop to the neighbor's cow as to plant things that Gertrude or Johnny, or Mother and Dad, cannot stand, however teeming in vitamins they may be. Perhaps a war year is not the time to try to change completely the eating habits of your family. (If this be heresy the Department of Agriculture will have to make the most of it.) So plan your plantings with some thought as to how your garden products are going to appeal when cooked and on the table.

Get a seed catalog and consider its contents carefully. It would be well to skip asparagus, both because it requires space and takes several years to get into bearing. Beans, on the other hand, are a "must", both because of their edibility and their nutritional value. Stringless Green Pod and Tendergreen are both excellent for bush beans, and there are several good wax beans in the stringless class. A newcomer among the pole beans is Potomac, chosen a winner in the All-America trials this year. It bears more heavily than the old standby, Kentucky Wonder, and produces long, round, stream-lined and meaty pods of fine flavor. Pole beans can be trained up out of the way in rows, or on a fence, and yield much more heavily than bush beans. They require spraying, however, in territory where the Mexican bean beetle is prevalent. Edible soy beans are coming to the fore fast. While delicious to eat as green shelled beans, they are as yet shy yielders. However, they are unattractive to the bean beetle.

A new lima bean is Cangreen, which keeps its color when dry and is fine for quick-freezing. It has dwarf habits and is highly recommended by the All-America Committee. Since lima beans do not do well everywhere, check local authority to be sure whether or not to try them.

Broccoli is a crop that has a place in northern gardens, and does well in the South in cooler months. The branching varieties, such as Calabrese, last through a long season and until after light frosts start the leaves to falling. Too many families have relied on the market for this crop, which is easily grown in the home garden and is better when picked the day it is used.

Brussels sprouts is another crop deserving wider attention. They come on late, unless started early in a cold frame, but are delicious in the autumn. They always command a good price in the food stores. Cabbage hardly pays except in the larger gardens, and even there try the luxury Savoy or crinkled sorts, since ordinary cabbage is usually good and cheap in the markets. Cauliflower is fine, but rather difficult for

The market garden products of the Krause farm in Illinois show what luscious things the Victory Garden produces.

most home gardeners. All members of the cabbage family must be sprayed to keep down caterpillars, and they are also quite susceptible to plant lice, especially Brussels sprouts.

Collards and mustard are two grand crops that yield prodigious amounts of vitamin-rich leaves, and are ready to use early in the season. I must confess that all my salesmanship has failed to interest my family in these, although our cook makes these greens both tender and tasty. Swiss chard is another long-season leafy vegetable that bears and bears and bears.

Carrots are a "must" because of their vitamins, fine flavor and keeping quality. Fortunately, most families seem to like them. It is a good idea to plant a succession, so as to be able to eat them young and still have a good supply left over for winter use. Chantenay is a good variety, or one of the others with the same shape, such as Tendersweet.

Beets are desirable in any garden and most people seem to like them. The tops with young roots make about the finest of early greens, so plant them fairly close although remembering that each beet "seed" contains several seeds and will send up a number of sprouts. Red Ball, Detroit Dark Red and Early Wonder are all good. Beets, like most vegetables, taste best when young and pulled fresh from the garden. They also keep well in cool storage or in sand in the cellar, and are easily canned or pickled for year-round use.

Celery is fine for the large garden, although discouraged nowadays because of its vitamin deficiency.

Corn is a large subject, but do not fuss around with two rows fifteen feet or so long. To do so will hardly give you back your money. There is only one way to have fine sweet corn and that is either to grow it yourself or to buy it from a farmer nearby. If you have the land by all means have two or three long rows, preferably of one of the new hybrids such as Marcross, Spancross, Golden Cross Bantam, or old Golden Bantam itself. This is still a favorite of millions even though the sweet juicy ears are not quite so long or so numerous as on some of the newer varieties. One can not afford to be too choosy this year because of the scarcity of seed, so almost any good sweet corn will do if well grown, picked at the right time and cooked while fresh.

Cucumbers are a luxury crop, but do not let that worry you if you like them well enough. A hill or two, kept free from bugs—none too easy a task—will reward you with all the raw salad and pickles you can use with a few to spare for the neighbors. Marketer is the name of the new Blue Ribbon introduction, but if you cannot find that in your catalog, try Straight 8, or almost any of the newer and better varieties. All cucumbers taste pretty much alike if picked at the right time.

Endive is a salad plant neglected by the nutritionists, but it is excellent eating if you like its pungent flavor. It has a longer season and keeps better than lettuce, especially in the hot or cold months. The Italian markets always have this in winter, and no one knows more about salads, unless it be the French, who also favor the endive.

Skipping over such luxuries as eggplant, mushrooms, okra and kohl-rabi—all all right in their place—we come to lettuce. Most people know only the Iceberg type that comes from California in a more-or-less crisp head like a cabbage. Any blanched vegetable, of course, contains less vitamins and other valuable elements than one that is full of the green chlorophyll pigment. Lettuce is hard to head up solidly in most home gardens, so why not go in for the loose-head types such as Grand Rapids, Cos or Romaine. Succession plantings of lettuce are necessary to have it fresh and tender on the table the season through, as it rapidly goes to seed in hot weather. Plant three kinds of seed at least three times during the season if your family are lettuce eaters, and even then you probably will not have enough.

Muskmelons and watermelons we can skip, unless you have lots of space and the patience to keep them free from beetles and other pests. Onions are worthwhile in a large garden, either from sets or seeds, but they are always available in the market at fairly reasonable prices. Chives should be planted for seasoning, and it is nice to have a few leeks for their mild flavor, but there are more important things to grow in a war year.

Peas unfortunately do not do much for the average gardener unless planted very early, and then you hardly get your seed back unless your soil, site and climate are favorable. Check with your local garden expert on this, however, for if you succeed with peas you can have two or three messes of one of the finest vegetables in existence. There is nothing much new with peas, and, generally speaking, the midseason, wrinkled varieties such as Thomas Laxton are best.

A short row of parsley should be in every garden. I always plant parsnips, too, but they are not a "must" unless you really like them. They keep perfectly in the ground all winter, which saves storage. Salsify is another much-neglected vegetable that keeps itself all winter and has a delicious oyster-like flavor. But do not blame me if your family will not eat it, delicious though it may be to one who likes it.

The Crow

By JANET NORRIS BANGS

They have shot the crow for bounty,
Hunted him south and north;
Killed him in every county
And never marked his worth.

They said his voice was husky
And clamorous in the morn.
A robber rough and dusky—
They said he stole their corn.

Now the cutworm feeds in the garden
The white grub takes the yield,
"Where is the crow, game warden?
Grasshoppers in the field".

The caterpillars are coming
Call back the crow, again,
Dead with the hunters' bombing,
Ten hundred thousand slain.

A few plants of sweet peppers are worthwhile. The latest pepper is Early Pimiento, an All-America selection, but any good sweet pepper will do. If you like them hot, plant a few of that kind too.

Potatoes can be omitted except in very large gardens, as they do not pay in small enclosures, or in sections that are not adapted to their culture. Potatoes are a staple in the market and usually at reasonable prices, so do not worry too much about growing them.

Radishes are a luxury, I suppose, but so desirable to one who likes them that no garden can be without at least a short row of Red Giant or White Icicle. Radishes come on early and can be pulled out to make way for other crops, or they may be planted in the row with other slower crops and pulled out to make room for them. They are not rich in vitamins, proteins or anything else, being largely water and crude fiber, but if you like them nothing takes their place. A ten-cent packet of seed will give you a lot of radishes before the other crops are ready.

Squash is a major crop in our family, particularly the summer varieties. We like both Cocozelle and Zucchini in the bush varieties, and, contrary to official propaganda, they do not take up too much room in a small garden. Of the fall varieties I favor Acorn or Table Queen, a good keeper and delicious cut in half and baked or roasted. The larger winter varieties are fine, too, if you like them and have the space, but they are always available in the market at fairly reasonable prices.

Spinach is fine, but is a short-season crop, and is apt to go to seed before you can harvest it. There are many other greens that will give you better results for your money, if you like them, including chard, mustard and New Zealand spinach, which does not belong to the spinach family at all.

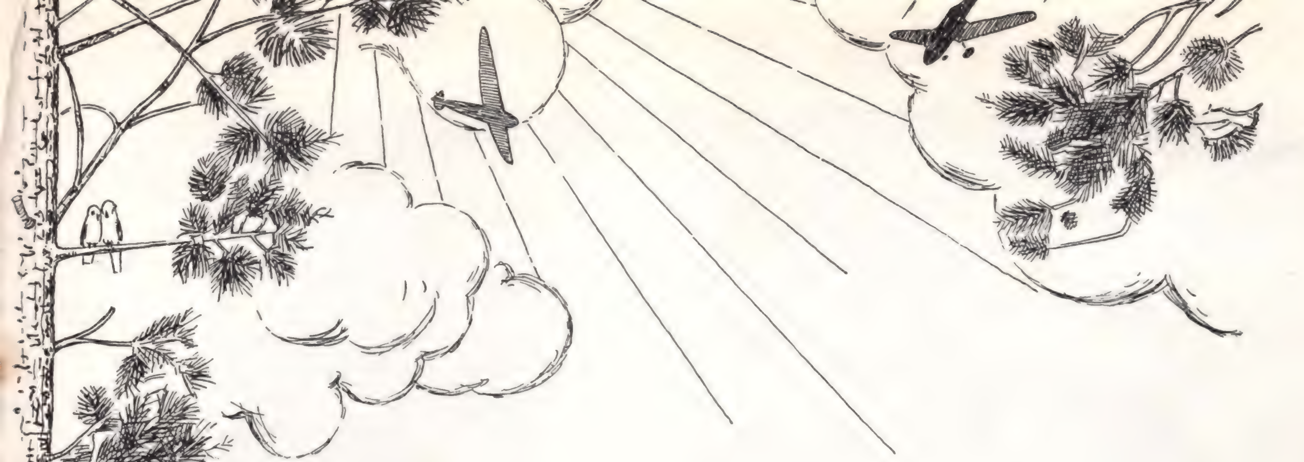
Tomatoes are one of the best paying crops in any garden. Start them early in a cold frame, or buy good named plants and give them good care. You cannot go wrong on tomatoes, but plant at least one early and one mid-season sort such as Table Talk, Marglobe and Rutgers. For a change try Jubilee, the new All-America orange-yellow variety.

Plant turnips and rutabagas by all means if you like turnips or turnip greens; otherwise thumbs down. Turnips can be planted in early July to mature in corn rows, or between other crops.

There are a few general rules this year. *Do not* plant a garden unless you fully intend to follow through. *Do not* buy more seeds than you need. *Be sure* that your ground is all right and take care in its preparation. You will need fertilizer and perhaps lime, and most certainly tools and insecticides. All these things are not too easy to obtain this year, and are too valuable to waste or to hoard at the expense of your neighbors. So look ahead and plan before you dive into the sea of Victory Gardening. It will pay you many times over if you take it seriously, but *we cannot afford any Pearl Harbors on the Victory Garden Front this year!*

One agency established to help prevent such disaster is the National Victory Garden Institute. This new organization was incorporated last fall as a non-profit, educational institution to encourage gardening. It is cooperating fully with the U. S. Department of Agriculture and other official and private agencies in an effort to help produce the food that is needed to win the war and to keep our people here on the home front healthy and in fighting form. We hear disturbing news about the possibility of serious shortages of canned foods, and of other important items that are usually abundant. It is up to home gardeners to grow as many of these things for their own use as possible, and to can, preserve or store all surpluses for use next winter. Many large companies are organizing employee gardens and army officials are beginning to plan for Victory Gardens around the military camps.

The truth of the matter is that we simply cannot have too many good gardens or too much home-grown food this year, as the commercial supply may be considerably smaller than we need for both military and civilian use. Further information about this volunteer movement will be supplied on request. Simply address National Victory Garden Institute, 598 Madison Ave., New York City.



The Loveliest Flower

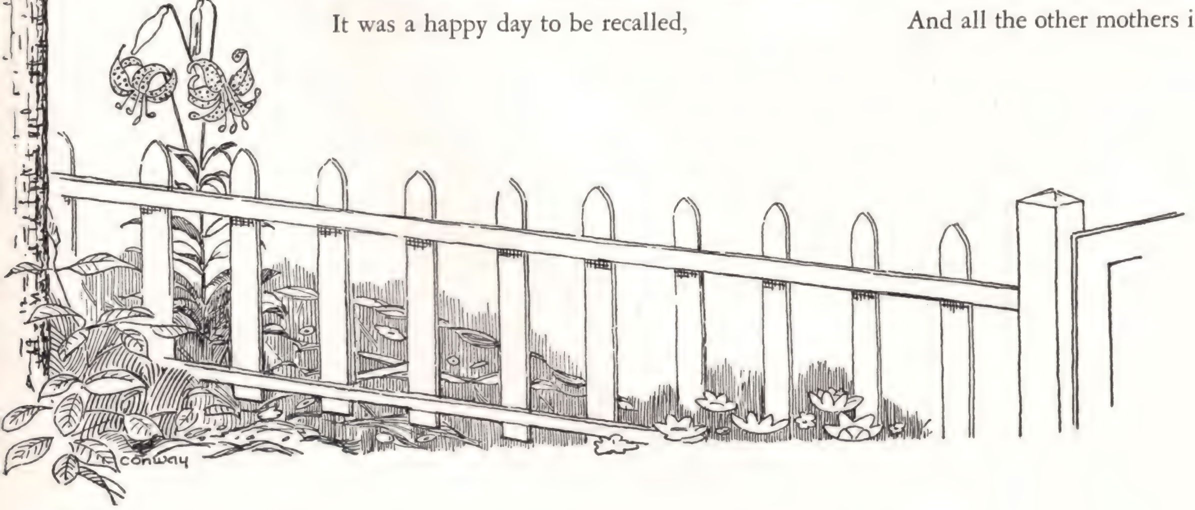
By LOUISE LEIGHTON

Decoration by Lawrence D. Conway

Sixteen years have passed since we came here
To live among the oaks and pines, and you
Were just a boy of four, delighted with
The fenced expanse of grass, the fields and groves
Beyond the gate. You came indoors to tug
At my young busy hands that lingered not
Too willingly at household tasks, and, "Come,"
You said. "Come out and see what I have found—
It is the prettiest flower in the world."

I took your hand and went with you to see
The tiger-lily just outside the fence
Which called your infant admiration forth.
Above our heads was brilliant summer sun;
The wind was thumbing over long green pages
Of the grass. We rambled on, and found
The pink polygala deep in the mould,
The yellow coneflower yielding to the light,
The nests of mourning doves and meadow larks.
It was a happy day to be recalled,
Not once but many times as years went by.
"The prettiest flower in the world," you said,
Although to me, the prettiest flower was you
Who led me through the fields with your small hand.

I saw your flower again today. It made
An orange light beside the fence, but you
Were not at hand to see the flame. Far out
By some strange sea, your ears beset with crash
Of bomb and falling wall, in dust and heat,
You fight an alien race, while death surrounds
You in the skies, and rises from the earth.
Will you come back some day, my lad, my lad?
In spite of death's pursuit of you, so close,
So terrible, will you escape—return
Unscathed, and cry to me, "Oh, come—come out
And see! Behold the flower of peace has bloomed—
The loveliest flower in the world—for you
And all the other mothers in the world!"



In June the Labrador tea bushes are covered with showy white flowers that are intoxicatingly fragrant and a mecca for insects.

Muck-i-go-ba is the Chippewa name for that gift of the marshes and flavorful beverage, the—

Labrador Tea

By MARIE BARLOW

MORE and more people in these wartime days are returning to the good old custom of gathering roots and herbs and brewing the old familiar herb teas that great-grandmother brewed in colonial times. We hear of cassena, and mint, of chamomile, and sassafras. But Labrador tea, one of our best and most palatable varieties, seems to have been almost entirely overlooked. This native tea substitute, as delicate in flavor as the finest China tea, can be found from the peat bogs of the near Arctic to the swamps of the northern states.

The Labrador tea, *Ledum*, two species, is a small evergreen shrub, one to three feet high, belonging to the Heath family. It is easily identified by its elliptical, deep-green, leathery leaves, brown and fuzzy on the under side, and by its hairy stems. In June the bushes are covered with terminal clusters of showy white flowers, so intoxicatingly fragrant that they form a mecca for the insects of the neighborhood.

The leaves are the part used for tea, and, because of their leathery texture, do not need any special drying or preparation. Just pick them and store them in a cloth or paper bag and they will keep indefinitely. To make the tea, use a teaspoonful of leaves to a cup of hot water. Be careful not to cook or steep it too long, for then the delicate flavor that it boasts will be lost.

The Labrador tea is an Indian remedy for rheumatism and stomach ailments, and is very mildly narcotic. Its commercial use has been approved by both the Wisconsin and Michigan State Boards of Health, and it has been placed on the market in these states. In the North the tea is most commonly known as Indian swamp tea. I first learned of this tea many years ago when I ventured into the Chippewa Indian settlement one cold winter day and found the squaws brewing the drink. We sat by the fire, while the snow blew in great drifts, and the winds howled in impotent fury. In such a setting the old Chief told us a legend, as old as the tribe itself.

"Way back in the beginning," he said, "a great trouble had spread over the land of the Chippewas. First the summer was hot, and no rain fell, and the pumpkins and potatoes scorched in the fields, and there were no fruits or berries to store away for winter. Then the cold and snows came early and the snow piled deep. The deer and the rabbits and the birds fled before the wrath of winter, and hunger walked through the land. The sun turned his back on his people and they sickened, and many had sore empty stomachs, and lay ill in the lodges with aching bones. As the hunters returned without game, and the sickness increased, the people prayed

(Continued on page 220)

There is special joy and excitement in befriending—

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The Lord's Tiny Poultry

By WILLIAM BYRON MOWERY

ABOUT a dozen years ago my three children and I began experimenting in an attempt to domesticate American birds, as a hobby. We have pursued it ever since, in Illinois, Florida, and elsewhere. As a recreation it is tops. It costs almost nothing, and it has taken us outdoors to sunny fields and green woods. We look back on it with pleasant memories and anticipate each new spring with keen zest.

Gradually this avocation grew into something larger than a hobby: we felt that we had stumbled upon a big and exciting idea. To explain this idea to you, let me tell you about little Jo-dee—her raising, her friendship with our family, and the ancient song she sang.

Jo-dee was not one of our prize pets; she was not even a native American bird but an English sparrow, which is a songless, fussy pest and a competitor of our native species. (We raised several English sparrows each spring, chiefly for experimental reasons.) But she illustrates what can be done with the poorest possible bird material.

Somebody brought Jo-dee to us when she was a little ugling a few hours out of the egg. As with a baby redbird, downy woodpecker, white-eyed vireo and a song sparrow, she was put into a coffee-can nest on the back porch. Good nests can be made of coconut shells, small flower pots or old strawberry boxes. We used ordinary shallow, pound-size coffee cans merely because we had lots of them. The can was without lid and the nest was of the open type, like a robin's. The best place to put the can is right on the floor, because if the fledgling tumbles out nothing but its feelings gets hurt.

Inside the can we put an outer, permanent lining of grass, newspaper or leaves. For the inner lining, which should be changed occasionally, the best material is plain toilet paper. Make a half dozen laps of it around your fist, pat the end shut, take your fist out, and in three seconds you have a nest lining that is warm, absorbs the moisture and keeps the fledglings dry, and can be easily renewed.

For her food, Jo-dee, like all our other pets, got nothing but baby-chick mash. She was watered with a dropper. Once in a while her nest got changed, and she was dusted every few days with pyrethrum powder to kill mites. She got her moistened pellets of mash only about once an hour, and by whomever happened along.

From the very start Jo-dee was taught to come in response to a feeding call. This can be a whistle, hiss, a clear word, or a spoon tapped against a saucer, but it should be used at every feeding so that a fledgling will associate it with food and friendliness. To this call your bird will respond all its life. When she could sit on the nest edge and flutter her wings, she was ready to be taught to fly.

Again, we went to no fuss or bother. She was merely taken out and deposited in a small plum tree, where she would be safe from cats. There she could hop

The parent mockingbird looks at the expectant and cavernous mouth of its ever-hungry young.

from twig to twig, learn to balance herself, and make beginning flights of about six inches. In that plum tree of ours, during the spring and young summer, you could always see a dozen aerial toddlers getting acquainted with the world and lengthening their flights to a foot, a yard, then a near-by lilac.

When somebody appeared with the feeding saucer and called, they would pile out of the plum and come flying with tiny might and main. Some made it to the person, lit on his arm and were fed. Others fell short on the grass and were fed for making the good try.

For a week after leaving the nest, Jo-dee and the others were kept on the screened porch at night, for safety. We perched the gamins on an old laundry rack, and that little congregation surely made an odd sight by flashlight. There they sat in rows, owl-solemn—a weird mixture of baby grosbeaks, yellow warblers, American sparrows, orioles, redbirds, blackbirds, bluebirds and whatever else we happened to be raising.

Bluejay twins adopt an almost identical pose as they await dinner. They will probably grow up to be lovely but quarrelsome birds.

As soon as she could fly well, Jo-dee was encouraged to find her own roosting place outdoors. Full-fledged now, she led an ordinary sparrow life. She could fend for herself and mostly she did. But she stayed with us freely, chirping and fussing around us like a tiny bantam hen. She lit on the lawn mower handle when we stopped. She lit on our book and pecked at the print. She was as much a part of the household as any dog, cat, chicken or other domesticated creature could possibly be, and nothing of an alien.

Jo-dee developed a personality and little tricks of her own. She liked to have a tug-of-war with one over a bit of colored string—undoubtedly a play-preparation for the serious business of nest-building. She was fond of hopping around in the sand-pile when the tots of the neighborhood were digging in it.

Summer and fall passed, our migrants left us, but the semi-migrants such as redbirds and the full residents like Jo-dee remained. One blizzardy December evening I decided to keep little Jo-dee inside for the night. That settled it—Jo-dee roosted in the house for the rest of the winter. She would appear at the kitchen window in the late-afternoon gloom, hop along the sill until someone let her in, then go straight to a window mantel in the dining room, her favorite perch.

From this habit developed little Jo-dee's most engaging trick. By our dinner time she would be hungry. I would fix food for her on a small wooden plate and then call. She would fly down to the table, sit on the corner at my right and eat. She ate anything we had, but preferred green lettuce, coconut shreds, and hard cornbread. Then she would take a drink of water from my spoon, scrape her beak on the edge of her plate and go back to her niche.

The English sparrow is supposed to have no voice beyond a few harsh chirping notes. But Jo-dee had a very beautiful little song. She always sang it just after being let into the house. It was not the sleepy twittering of a bird going to roost, but a true sustained song—dainty, full of spirals, and as fine as the fragile moon-song of the olive-backed thrush. I can explain Jo-dee's remarkable ability only by the fact that the English sparrow belongs to the finch family, the Fringillidae, which includes some of the best singers in the world. Evidently English sparrows can sing if they want to.

To raise a fledgling is as simple as indicated in Jo-dee's story. At my first few attempts I went to elaborate pother—eider-down nests, electric heating pads, balanced diet, and so on. I thought fledgling birds were perishable little things, but experience taught me they are incomparably hardier than a baby chick or turkey. Some of those waifs came to us starved, frozen, torn by jay or shrike—and pulled through!

In a state of Nature fledglings need to be hardy. They have to weather heat, cold, rain, sometimes snow; hunger when the food supply fails the parents; and infestation by mites, which kill many young birds and cause the parents to abandon countless nests. They are preyed on by cat, weasel, mink, fox, red squirrel, snake, owl, hawk, jay and shrike.

As you can imagine, infant mortality among birds is appalling. Only a fraction of the fledglings hatched out ever live to know the ecstasy of flight. In their life span a pair of birds will produce, say, sixty eggs. On the average *only two* of these will come to maturity. One chance in thirty—these are the odds that Nature imposes, in her solicitude for the benefit of all.

If you find a fledgling, or a nest of them, threatened by danger, do not hesitate to remove them to the coffee-can nest. You will come across plenty of fledglings that need you. Just as a person with only book knowledge of wild ginseng can walk through a woods full of it and see hardly any, so it is difficult at first to find these feathered waifs, but with a little experience you will turn up a number of them. You will look up at a nest, then look down at the ground and see that one has tumbled out. You will spot nests that have been abandoned by the parents, and will learn to recognize the thin pathetic squeaking of the doomed little things. You will find the runt that has been left behind. You will pick up a tiny thing that a nest-robbing jay has stolen and dropped—as we found our star of stars, Diana. You will find nests where the young simply have not a chance on earth. A phoebe nest in an old well is an example of this. On their first flight the young cannot make it to the top, fall to the water and drown; yet the parent birds go on nesting there year after year.

Adult wood pewee watching over the nest with its newly-hatched young. The odds are against the successful raising of all of the brood.

This fine recreation is open to anybody except apartment dwellers in large cities. No special equipment is needed, no technical knowledge, no big grounds. Any postage-stamp-size backyard is enough for a few birds. But how these few can light up the whole summer for us!

The tameness of the coffee-can fledgling is something one must see to understand. As you and I know, taming an adult wild bird is a hard, unsatisfactory business. With time and patience a wild bird can occasionally be induced to eat from the hand, but this is the exception, and the bird is not really domesticated then. But if you raise a bird from scratch and it has never known wildness, the little thing will regard you as a natural part of its world and from then will be your life-long friend.

Some years ago a big, pious French-Cree and I camped on Great Slave Lake in northwestern Canada. In the midnight dusk out across the Arctic barrens we heard ptarmigan chortling in the willows, and white-crowned sparrows sending up their silvery song. My companion motioned at the birds. "*Les p'tites volailles du bon Dieu*," he said. "The Lord's tiny poultry."

This, I think, is the way we should regard our birds—a diminutive sort of poultry that is still in the domain of *le bon Dieu* but which we may sometimes tame, to their great gain and to ours.

After we have raised our fledglings we should give them a little simple care, and extend this also to their wild kin. Birds need water for drinking and bathing. A shallow crock with some rocks in it does fine. Most baths are too deep. A bird will not bathe in water much deeper than its knees.

Several small feeding stations are better than one, because a few large birds can monopolize a dinner table. Birds like all sorts of grain products, kitchen scraps, meat trimmings and greens. An old head of cabbage will last many days.

The kindest favor we can do our birds is to supply them with a dust bath. A bird bathes in dust to get rid of its mites. More than three hundred kinds of mites are known. They kill many birds outright and weaken a great many more. The long rainy spells of spring cause a high mortality among birds—not by bringing on pneumonia epidemics, as was formerly thought, but by muddying the dust wallows and thus allowing the mite plague to grow unchecked. I use dolomite dust with a little pyrethrum mixed in, but any kind of very fine and *dry* material, even road dust, will do perfectly.

Some of our birds deserted us, some migrants did not come back, and others hung around mostly for the grub, but the great majority gave us an abiding friendship. Several exceptional ones stand out vividly across the years. Blue Robin, our gentle bluebird; Cheery, the yellow warbler; Slink Cuckoo, the rain-crow, sounding his ventriloquial *kow-kow-kow* as he cleaned up a nest of webworms; Frank Oriole (who turned out to be Frances Oriole); and our splendid scarlet tanager, Drake. All were even better pets than Jo-dee.

Perhaps the star of them all was Diana. We found her, a fledgling so small we could not identify it, in a field. Plucked from the nest by some robber, it bore a bad talon wound and was badly bruised from being dropped. It showed gameness under the cruel bite of our antiseptic, and it went home in a lace kerchief

Seven chickadees all in a row. So many disasters may befall both the parents and young of our birds that infant mortality is high. This affords frequent opportunity to human foster parents to raise birds orphaned by many causes.

to a special seashell nest on the back of my study desk.

From the very start Diana was a lady. She ate daintily, and preened her first pinfeather the instant it appeared. She was a cedar waxwing. This species' satiny elegance and exquisite coloring make it one of the prettiest birds in America, noted, too, for its bohemian ways, its polite habit of passing food to its neighbor, and other endearing graces.

Diana lived up to the waxwing reputation for unpredictability. I never knew what to expect of the shiny creature. One night she would roost in my study, behind a bust of Keats. The next, likely as not, she would spend away from home. When she perched on your sleeve and spoke the lisping flight-word of the waxwing, you wondered if she might be asking you to leave your work and go flying off with her. At cherry time she built her nest in a small live-oak and successfully hatched and mothered her three purpled eggs.

There will be other bird friends and fine ones, but never another Diana, with her gentleness, her slim elegance, and that touch of melancholy about her that seemed to explain her restlessness. Whenever I hear the faint lisp of waxwings in the sky, I wonder where she is—and hope she is happy.

Of our eight hundred species of birds, all are slowly dwindling except about one hundred. Some are either extinct or so nearly gone that they can never be brought back. We import foreign birds for pets and keep them in cages, while all around us scores of native American birds—which make the finest of pets if handled properly—go ignored and unknown.

That the dollar-and-cents value of our birds is enormous is indicated by these facts: *one* cuckoo will clean out five hundred nests of tent caterpillars in a summer; *one* brown creeper is "worth five bushels of apples" in anybody's orchard; *one* species, the field sparrow, annually destroys 980 tons of ragweed seeds in Iowa alone. Constantly our birds are fighting our battle against the insect world; scientists tell us that without them our sprays and other weapons would be inadequate and that insects might whip us in our ever-constant struggle for the earth and its fruits.

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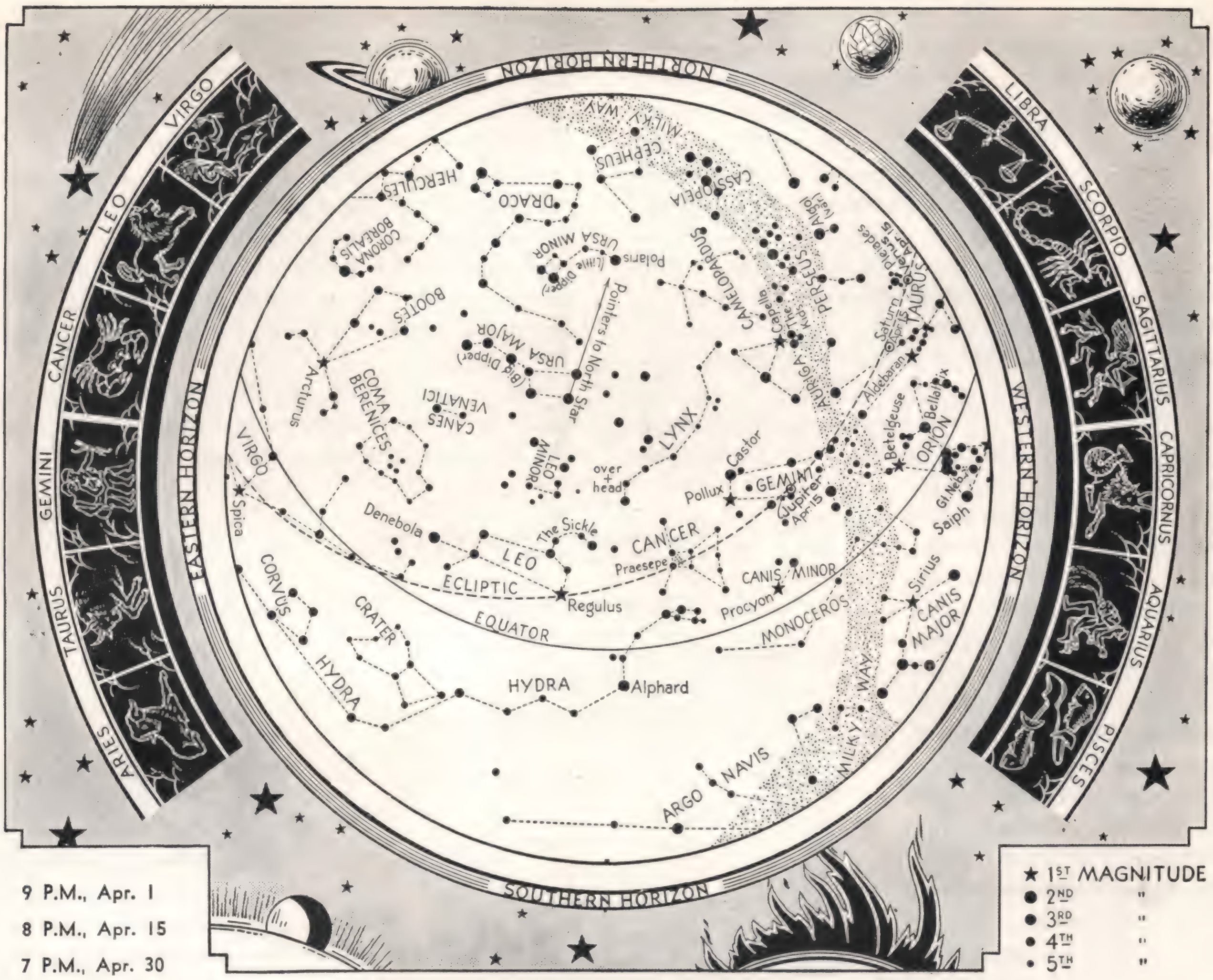
Moontrail

By ALLEN E. WOODALL

The moontrail leads over the hill
With the clouds piled high in the east,
Where the lightning plays in thunderless repose
And shadows deepen as the day goes still.
Now, sun and sunset gone, the sky released
From the last twinge of scarlet, flame, or rose,
Turns to the moon, the west in apple green
Glimmers behind sky-marching apple trees,
Lifting their barren fingers to the night,
The moontrail climbs, the slow gray shadows lean
Back from the moon, and these
Are dim with cricket melody tonight.


NORTHERN HORIZON
EASTERN HORIZON
WESTERN HORIZON
SOUTHERN HORIZON
VIRGO
LEO
CANCER
GEMINI
TAURUS
ARIES
LIBRA
SCORPIO
SAGITTARIUS
CAPRICORNUS
AQUARIUS
PISCES
MILKY WAY
CEPHEUS
CASSIOPEIA
HERCULES
DRACO
CORONA BOREALIS
URSA MINOR
(Little Dipper)
Polaris
Pointers to North Star
URSA MAJOR
(Big Dipper)
BOOTES
Arcturus
COMA BERENICES
CANES VENATICI
CAMELOPARDUS
PERSEUS
Algol (var.)
Pleiades
TAURUS
Saturn Apr. 15
Aldebaran
AURIGA
The Kids
Capella
LYNX
LEO MINOR
over head
Castor
Pollux
GEMINI
Jupiter Apr. 15
Betelgeuse
Bellatrix
ORION
Gt. Neb.
Saiph
VIRGO
Spica
Denebola
The Sickle
LEO
CANCER
Praesepe
ECLIPTIC
Regulus
EQUATOR
CORVUS
CRATER
CANIS MINOR
Procyon
MONOCEROS
Sirius
CANIS MAJOR
HYDRA
Alphard
HYDRA
MILKY WAY
ARGO NAVIS
★ 1st MAGNITUDE
● 2nd "
● 3rd "
● 4th "
• 5th "

9 P.M., Apr. 1
8 P.M., Apr. 15
7 P.M., Apr. 30

To use this map hold it before you in a vertical position and turn it until the direction of the compass that you wish to face is at the bottom. Then below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south. Time given is Standard Time; add one hour for War Time.

Within the Zodiac

By ISABEL M. LEWIS

A REGION in the heavens of special interest and importance is the zone or belt known as the zodiac, which extends eight degrees to either side of the ecliptic and completely encircles the heavens. The ecliptic is that great circle of the celestial sphere that marks the yearly course of the sun through the heavens. It is also known as the great circle in which the plane of the earth's orbit intersects the celestial sphere. A line drawn from the sun to the earth will, in the course of the year, trace out on the celestial sphere this great circle called the ecliptic. Similarly a line drawn from the sun to each of the planets in turn will trace out that planet's course through the heavens in its period of revolution around the sun. The moon, which revolves around the earth, will complete its circuit of the heavens once each month within the zodiac. The orbits of all these bodies do not depart more than eight degrees from the plane of the ecliptic and so that is the distance that the zodiac extends to either side of the ecliptic. Asteroids, comets, meteors and all objects moving around the sun also cross the plane of the ecliptic and enter the zodiac but many of them, because of the much higher inclinations of their orbits to the ecliptic plane, pass far beyond its limits. Within the comparatively narrow limits of the zodiac, however, and *only* there, will one find the sun, moon, and nine major planets. This is a great aid in locating and identifying the planets. Once one knows the constellations of the zodiac and the position of the ecliptic in the sky, he knows where the planets will always be found—among these groups and not more than eight degrees distant from the ecliptic.

The zodiac was divided originally into twelve "signs", which then coincided approximately with twelve constellations of the same names. Each sign extended a distance of 30 degrees along the ecliptic, and the sun was in each sign in turn for a month. At the beginning of spring in the northern hemisphere the sun was at the point where the celestial equator crossed the ecliptic. This point is an important point of reference in the heavens known as the vernal equinox, and, also, as The First Point in Aries, meaning the sign of Aries, the first sign of the zodiac, which was then in the constellation of Aries. The twelve signs of the zodiac are those depicted above in the border of our sky map. The three spring signs were, in order, Aries, The Ram; Taurus, The Bull; Gemini, The Twins. At the beginning of summer the sun entered the sign of Cancer and passed in turn through the three summer signs of Cancer, The Crab; Leo, The Lion; Virgo, The Virgin, or Maiden. Autumn started with the sun entering the sign of Libra, The Scales; the two following Autumn signs were Scorpio, or Scorpius, The Scorpion, and Sagittarius, The Archer. Winter began as the sun entered the sign of Capricornus, and the two following signs of winter were Aquarius, The Water-bearer, and Pisces, The Fishes.

To a Song Sparrow

By EDNA A. PIGMAN

Tell me, oh happy bird,
Song spirit of some Eden world,
Whence have you gathered in one tiny breast
Such wealth of song?
How stored it in that dun and spotted throat
The winter long,
That now forthcoming, note on note,
Leaps from its storehouse on the air afloat
As by some power hurled?
Thus I, with ear for each sweet ecstasy
And pen poised on the page how carefully,
Find not the word
To set down what I've heard.

The signs of the zodiac are fixed in position with respect to the vernal equinox. The first sign, that of Aries, will always occupy the first 30 degrees along the ecliptic counted eastward from the vernal equinox; but the vernal equinox itself is not fixed in position because of the Precession of The Equinoxes, which causes the pole of the equator to describe slowly a circle of 23½ degrees radius around the pole of the ecliptic and the equator itself to shift gradually westward along the ecliptic. It follows from this that the constellations of the zodiac no longer coincide with the signs that bear their names. The vernal equinox shifts westward along the ecliptic at the rate of about one degree in 70 years. In something like 2000 years it passes through 30 degrees and the sign of Aries "backs" or moves westward into the constellation Pisces and all the zodiacal signs pass into the constellations lying next to them on the west. So now, at the beginning of spring, although the sun is in the sign of Cancer it is in the constellation of Gemini; and when it crosses the equator going southward at the autumnal equinox it is in the sign of Libra but the constellation of Virgo. The signs of the zodiac are little used by astronomers and are of interest chiefly to astrologers.

Although those constellations known as the zodiacal constellations are only twelve in number, it is an interesting fact that several other near-by constellations encroach to some extent upon the preserves of the zodiac. The chief offender is Ophiuchus, The Serpent-bearer. There is a stretch of the zodiac in which the ecliptic passes through a considerable area that lies in this huge rambling constellation, between Scorpio and Sagittarius. Cetus, The Whale, also gets within the path of the moon and planets and almost touches the ecliptic itself at one point. Orion also is an offender, thrusting his uplifted club well within the eight degree limit of the zodiac. Sextans, south of Leo, is a small constellation that also comes within the confines of the zodiac.

The term zodiac means literally "zone of animals," and until the double constellation of Scorpio was divided many centuries ago into two, and Libra, The Scales, or Balance, formed from a portion of Scorpio that formerly was occupied by the creature's claws, all of the constellations were named for living beings. Among the zodiacal groups we find some of the finest in the heavens. Taurus and Gemini are exceptionally fine as are also Scorpio and Sagittarius. Some remarkable regions of the Milky Way lie within Sagittarius, where is located, it has been estimated, the center of our great galactic system. The location of the zodiac close to the celestial equator—the most distant parts never being more than about thirty degrees from it—means that it is seen to the best advantage within the tropics and is either very poorly seen or partly below the horizon at all times in northern and southern polar regions. This is particularly true of Scorpio and Sagittarius in north polar regions, and Taurus and Gemini in south polar regions.

One of the most beautiful features of the zodiac is the zodiacal light, a luminous wedge of light that rests with its base on the horizon and extends upward along the zodiac to a point about 50 degrees above the horizon. However, under fine conditions within the tropics it is sometimes seen as a luminous band extending from the eastern to the western horizon completely across the heavens. Directly opposite the sun, and even more difficult to observe, is the gegenschein or counter-glow, a faint luminous patch of light. The zodiacal light, always difficult to observe in the middle latitudes, is seen to the best advantage when the ecliptic rises most sharply from the horizon. That will be in the evening after sunset in the months of March and April. It cannot be seen near city lights or when there is moonlight. In its brightest portions, which are near the horizon, it is as bright as the more brilliant regions of the

(Continued on page 220)

Our Waterfowl

The Ducks, Geese and Swans of North America. By Francis H. Kortright. Washington, D. C. 1942. The American Wildlife Institute. 476 pages. Many text figures and maps of breeding and wintering ranges. Thirty-six colored plates, showing winter and autumn plumage, and downy young, of practically all species, by T. M. Shortt. Keys and other helps to identification; diseases and lead poisoning. Migration and banding by F. C. Lincoln. Conservation by Ira N. Gabrielson. $4.50.

This book, written "for the naturalist and sportsman", is by far the best all-round book on waterfowl that we have seen. While the author disclaims being an ornithologist, there is, as Aldo Leopold remarks in his introduction, "no lack of ornithological competence in what he has written". The reason for this thoroughness seems to lie in the fact that the author has taken pains to search out and quote from the voluminous and excellent recent literature many passages that help the reader to become acquainted with the various species, both in hand and in their natural habitats. No longer has the gunner any excuse to admit that he cannot tell one duck from another, to demand that his daily bag include species sorely in need of protection, *and to be accorded this privilege.* Witness the fate of the redhead, canvasback, ruddy, bufflehead and wood duck, formerly given complete protection, but latterly on the open list.

A subject that merits the most serious consideration is lead poisoning, in this book necessarily treated briefly and with fragmentary and old evidence. Certainly it is the duty of administrators to make a thorough study of this menace. Little imagination is needed to picture the conditions that must now obtain as a result of the concentrations of lead that have been poured for years into many areas, especially those near refuges.

Written for the naturalist and the sportsman (the latter usually being termed the gunner), this book certainly serves well both classes, and also that class of fewer numbers—the naturalist-sportsman. However, we must confess to a slight degree of disappointment in one feature. Naturalists are interested in *species.* "Waterfowl" will be common as long as a few species remain common. However, it is certain that certain species are still desperately in need of more rigid protection, and we fail to find any pronounced reference to this fact. Perhaps the cause of waterfowl conservation is presumed to be sufficiently covered by Dr. Gabrielson, whose chapter is excellent. But we cannot forbear regretting that more was not said about the relative numerical abundance of such birds as the Ross goose, the cackling goose, the redhead, canvasback and ruddy ducks, and a few others. Perhaps the author wishes to avoid a subject that might involve the necessity of referring to the fact that Canada produces the bulk of a resource that is harvested largely in the United States. The author is a Canadian, and Canadians are almost too courteous in this regard. Perhaps he wishes to avoid the question of total numerical population, a subject that some treat quite lightly.

In this connection, we note the statement, in the Proceedings of a Special Conference of Representatives of * * * * organizations interested in wildlife conservation, held in New York City in December, 1942, that "At present there is a continental waterfowl population estimated in excess of 100,000,000 birds, or approximately the same number that were estimated to have been in the United States 40 or 50 years ago."

To anyone who retains first-hand impressions of the hordes of waterfowl of that period, such a statement is ridiculous. It is not impossible that there are at present a hundred million birds. This would mean less than one bird to each person in North America. But to compare our pitifully-depleted stocks to the teeming flocks of the 1890's or the early 1900's certainly is a poor basis for any serious conclusions. Yet we venture to predict that this statement will be taken at its face value by many, and that the birds will suffer in consequence. Perhaps Mr. Kortright was wise in dodging any reference to such matters. E. A. P.

Any Ideas?

"Ideas Win Wars—Once upon a time gunpowder was only an idea!" This is the slogan on the bottom of the page containing a release from the Engineer School, Fort Belvoir, Virginia. And to accent this message, the release points out that the morning mail at the school is eagerly read for the ideas that it may contain—ideas that may help materially in the winning of this war. Engineer soldiers throughout the world are urged to send ideas, and civilians are also welcome to send any suggestion. This suggestion system is more than a year old and already eleven percent of the ideas sent in have been approved.

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The School Page

By E. LAURENCE PALMER

Professor of Rural Education, Cornell University, and Director of Nature Education, The American Nature Association

THE School Page is designed to help school people in their enjoyment of Nature and in their use of *Nature Magazine.* When the page is in an issue with one of the special inserts, it deals with the subject there considered. This month the insert deals with bird study, particularly of the study of western birds.

Under these circumstances, we are glad to publish here a paper written by two young men who are now in the armed forces. One hailed from the State of Washington and one from New York so their composite philosophy might well be cosmopolitan. Many beginners in bird study may profit by and enjoy the efforts of John Wanamaker and Paul Churcher to share with you their discovery of a new, lasting and worthwhile interest.

WHY BOTHER WITH BIRDS

"Why bother with birds?" an acquaintance of practical nature asked us recently. This was certainly nothing more than a simple and natural question, one that could be easily answered. Yet perhaps the answer given was not quite satisfactory, for somewhere in the midst of it there stirred the sudden realization that this was not a new question, that it was one that we, as students of ornithology, or more popularly referred to as "bird lovers", had met not occasionally but frequently. It was a question that all manner of people had put to us during the past few years, sarcastically, politely, seriously, but always carrying an emphasis that said with finality that there was no sense in "bothering".

They were wrong, we knew. There was sense, and it was more than "bothering". But how could we convince them? How could we in a few words bring them the opportunity to enter into a comradeship which we believe to be one of Nature's finest offerings? Well we knew that not caring for birds was only evidence that they did not know them, and not knowing was the one requisite that would bring them a Northwest Passage to a new and bright adventure. For us, who had already followed birds, the thrill of its discovery could only be a memory.

Well, here is our answer. Without any knowledge of birds themselves we all will agree that they definitely have a practical value. One need only turn to the various magazines, to the newspaper, to the radio, to find proof offered of this again and again. We hear and read much about the service that hawks and owls perform in keeping in check an ever increasingly destructive rodent population. We would venture that there are few school children who do not know the story of the monument to the sea gulls at Salt Lake City—a memorial to birds that saved the first crop of the early Mormons when a grasshopper plague threatened complete devastation. Under the Department of Agriculture, our government has established research laboratories to study and report the amount of weed seeds, insects, and the like that the individual species of birds consume, and to help in educating the public to the role that birds play in man's life.

Dollars and Cents

All of this is an established fact and thus we can even measure bird services to mankind in terms of actual dollars and cents. Yet there is another side to the story of the practical value of birds, a side that we feel is just as practical as any we have mentioned. In some respects, it is of even greater value, once we have learned that value can be measured in terms of appreciation, understanding and enjoyment of the living things about us.

Knowing of this source of wealth, we have learned to tap it freely. Just the other day, after spending long hours indoors in lectures and classrooms, we took the remainder of an afternoon off to go birding. Above us, on a hillside, killdeers were calling to one another as they circled and dropped on a freshly plowed field; from a fence post a meadowlark sent its song rolling down toward the busy streets below; in the distance a bobolink, whose black and white markings once led to the nick-name of "skunkbird", shamed this pseudonym with a breathless serenade in flight; over us, in the willows that bordered a little stream, redwing blackbirds were showing off their crimson shoulder patches and their chuckling cries rose above the chorus of spring peepers in the damp grass. Yes, to us, those birds had a value far greater than that any movie or ball game could offer. Yet we know some of you are saying "Well and good for those of you who know birds, but we're not built that way." And we agree with you to a certain point. But, we insist that to enjoy birds, it is necessary to be far less than an expert ornithologist; and for the knowledge that is required, very little time need be spent. Until a few years ago, killdeers, redwings, and meadowlarks would have meant little to us. We cared nothing for birds then, and to a great extent our attitude was one of choice and not of accident. Although we had lived near an unlimited supply of open country, and had had plenty of time for walks, we managed never to use it to look at birds. As far as they were concerned, we knew one or two very slightly, and the majority not at all; we had possibly shot a few and shot at a great many during hunting seasons; we were conscious of the fact that robins and sparrows and the like were forever inspecting lawns; but on the whole, birds had gone their way, and we ours, and we were content to leave their problems to them, and them to their environment.

Bird-walking

That is changed now, due perhaps to a certain quirk of curiosity in our own characters that brought on an experimental mood and led us, while thus off-guard, to meet at an eastern university a man well known as the only professor holding the title, "Professor of Ornithology", and to follow this meeting by going on one of his early morning bird-walks. These walks begin at the forsaken hour of five o'clock in the morning and to the uninitiated the first venture is practically a nightmare. You are half awake, half dressed, half breakfasted, and three quarters frozen. You shiver. You rub your eyes. You stumble over logs and bump into branches. You curse the folly that has led you into such a situation. Then, in the midst of your most violent self-pity, the miracle occurs. It may be a sudden flurry in a tree top, a flash of color, a glimpse of black and orange on a swaying branch, the clearness of an oriole's morning song. You stop to listen. That is the beginning, for you will be stopping and listening ever after, and you will find no greater satisfaction.

If there are some who do (Continued on page 220)

Books on Nature Lore

Nature Lore, or Listen to the Voice of Nature, has been prepared by the author, H. P. K. Agersborg, as collateral reading for students of Nature study and biology in the graded and high schools. There are five volumes, issued by the C. C. Nelson Publishing Company, Appleton, Wisconsin, in 1942, at $2 a volume. The books contain some of the results of many years of earnest study by a trained biologist interested in a wide range of subjects.

There seems to be no attempt to correlate the subjects with regular school curricula. The volumes, however, are well indexed, and we believe that the teacher will have no difficulty in adapting the subject matter to any course in zoology, conservation, or just every-day living, in any community, especially in the eastern two-thirds of the country, and, in principle, in any state.

Here and there through the volumes the author gives us glimpses of Nature from experience in Norway, his native land. These add to the interest and value of the text, because, especially in the case of birds, the species are closely related to our own, and in some cases are identical.

All through the work the author urges conservation of our resources, basing his pleas on both economic and esthetic grounds. Since all organisms require water, and it is in water that life is believed to have originated, one is not surprised to find that the interrelations of the inhabitants of waterways are given special consideration.

The author not only tells how to manage swamps, ponds, streams and shores so that they may yield their utmost values, but also how to avoid damaging them by so-called improvements, some of which may utterly destroy their usefulness. In similar fashion he shows that the wastes that come from human activities on small tributary brooks may be so treated that they will benefit rather than injure the life of the larger streams into which the tributaries flow.

Dr. Agersborg has done intensive biological work in several States, notably in New Hampshire, Pennsylvania, Virginia and Illinois, and in all this work he has recommended improvements in methods.

In New Hampshire, particularly, a beginning has been made along some lines that he recommends. Surveys of the main fish resources on the different watersheds have been published in which, among other features, the principal sources of pollution are designated. These surveys are surely based in part on Dr. Agersborg's work, although apparently his name does not appear in the reports.

We have heard a lot about stream "improvement" within the past few years. As old-timers and long-time users of natural streams, we have feared that many streams would be injured rather than improved because much of the work might be done without any intelligent study of the natural capabilities of the watercourse itself, or of the weaknesses that might be overcome by intelligent attention. Agersborg convinces us that our fears were justified, for he tells us of examples of both good and bad work, sometimes illustrated by actual photographs.

He discusses foods and their value, Nature sanctuaries, the importance of correlating conservation with school courses in zoology and Nature study, the farmer and the land-owner, and a host of other subjects of vital importance in our daily life. He even tells of the historical, economic, biological, and even spiritual values of ancient stone walls, reared by the brain and brawn of generations now passed away.

We bespeak for these volumes the attention of all teachers who are called on to teach Nature from an economic and esthetic viewpoint, believing that they and their pupils will be well repaid by studying them closely.—E. A. P.

Gardens and Insects

Getting the best from your Victory Garden, and thus contributing to the fullest to the objectives for which the garden has been planted, depends in large measure on keeping injurious insect pests under control. This means knowing which pest is which, and then what dose will eliminate it. Although naturally it is concerned with Black Leaf 40, an extremely helpful booklet has been prepared by the manufacturers of this insecticide to help the gardener. It contains much helpful advice and a very useful dosage chart. Copies of the booklet, which is entitled "The Role of Black Leaf Products in Food Protection," may be obtained from the Tobacco By-Products and Chemical Corporation, Louisville, Kentucky, or from its Pacific Coast office at One South Park, San Francisco, California. When you write say that you do so at the suggestion of Nature Magazine.

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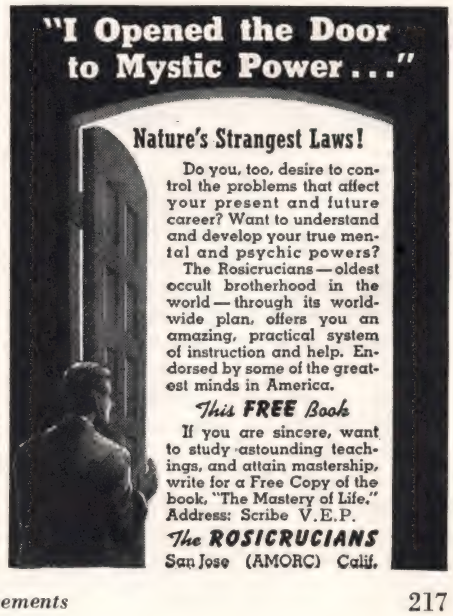

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NATURE IN PRINT

As a convenience to readers the books reviewed in the pages of Nature Magazine may be ordered through the book department of the American Nature Association, 1214 16th St., Washington, D. C.

(Continued from page 203)

living.

It would thus be misleading to attribute significance for all men and women to the daily experiences of Mrs. Rich, experiences largely of interest because they are so intimately hers—not common. Nor would it be faithful to describe her life as characteristic of the woods. In it the wild creatures are chance acquaintances like the pigeons one sees in passing through the city park. Some of these acquaintances come home to the Rich's cabins but the visits are not returned with such social purposes as a naturalist might have. *We Took To the Woods* is more like *R.F.D.* than like Thoreau's *The Maine Woods.*

Undoubtedly, thus, Mrs. Rich in many ways feels more in common with the editors of magazines in metropolitan cities than she does with the wild creatures who are her most numerous neighbors. She is in the woods but not of them in any back-to-Nature sense. Yet she has found it easier to be herself—this civilized self—in the wilds of Maine than in the so-called centers of the culture of which she is a part and to which she is contributing. Looking back on her going to the woods with her husband, she writes, "I think that we were unconsciously seeking to find a lost sense of our own identity." Obviously she succeeded, and with her success achieved peace and much happiness.

It is the fact of success and not its setting that seems significant in *We Took To the Woods.* "Certainly," says Mrs. Rich, "I am more at home in this world that we have created than ever I was in that vast and confusing maelstrom that we call civilization," and the central fact seems to be that she has indeed created a world—created it herself so well that within it she can declare: "I am free."

Like Felix Salten's "little world unto itself" and Louise Dickinson Rich's "world that we have created," perhaps we all have creative resorts of which we think too little, and from which we might do much for the larger world that we all share.

A Forest World. By Felix Salten. English text by Paul R. Milton and Sanford Jerome Greenburger. Indianapolis and New York. 1942. Bobbs-Merrill. 274 pages with 23 drawings by Bob Kuhn. $2.50.

We Took To the Woods. By Louise Dickinson Rich. Philadelphia and New York. 1942. J. B. Lippincott. 322 pages. 21 photographs. $2.75.

Conservation Teaching

Conservation for Tomorrow's America. By Ollie E. Fink. Columbus, Ohio. 1942. Ohio Division of Conservation and Natural Resources. 144 pages. Illustrated. Fifty cents.

The urgencies of wartime have brought into focus the vital importance of our natural resources, their conservation and wise use. In fact, the emergency has accomplished this more rapidly than the urgings of forward-looking conservationists have been able to do. It has also emphasized the importance of teaching conservation to the young men and women who will soon have to take over from a generation whose conservation record leaves much to be desired. In meeting this educational need this book will be very valuable, not only in Ohio but in other States with similar problems. It is prepared by Mr. Fink, who is curriculum supervisor of conservation education, in collaboration with a committee of teachers. The Ohio Division of Conservation and Natural Resources has cooperated with the State Department of Education in publishing this teacher aid.

Epitaph and Epilogue

Extinct and Vanishing Mammals of the Western Hemisphere. By Glover M. Allen. New York. 1942. American Committee for International Wild Life Protection, Zoological Park, New York City. 620 pages.

This valuable book is a record of exploitation; of the impact of man upon fauna and the sad result to the latter. Between its covers the late Glover M. Allen, one of the great naturalists of his day, records those species of New World mammals that have been exterminated or seriously depleted by human agency during the past four and a half centuries, and the oceanic species of world-wide distribution that, within the historic period, have suffered similar reduction. The volume is, then, essentially zoological history, and, as such, a compilation of tremendous value. Dr. Allen covers the form, distribution and causes for the decline or extirpation of the various species. Man, of course, is the cause in almost every instance, his motivation having been commerce and sport.

Shanks' Mare

Guide to the Appalachian Trail in the Southern Appalachians. Washington, D. C. 1943. Appalachian Trail Conference, 808 17th St. 450 pages. Maps. $1.75.

There is no rationing on footsteps, and one of the ration coupons in your sugar rationing book will be good for a stout and comfortable pair of shoes, so those who wish to take their exercise and recreation on the trail can still do so. For those who hike the Appalachian Trail, on any part of its length between Maine and Georgia, can supply themselves with excellent guides to the route and to its facilities. This new edition of the guide, covering the southern part of the Trail, has just been issued and contains the up-to-date information necessary.

Copra and Lather

If the soap you use does not work up a quick and easy lather, lay it to Hirohito. Coconut oil from copra comes from the Philippines and other Pacific islands and contains a large proportion of lauric and myristic acids. These put the lather in soap, and the oil crops now pinch-hitting, such as cottonseed, soybeans, flax and peanuts, have practically none of these acids. So this year's soaps will reflect the change. There appears, however, no imminent danger of soap shortage because, says the Department of Agriculture, "the supply of inedible tallow and grease is comparatively abundant and is being supplemented by household collection of fats and greases, which are available for soap making after glycerin is extracted for use in explosives."

Correspond

Miss Cecil Flook, Milford, Indiana, is interested in all phases of Nature, particularly birds, and would like to correspond with others having similar interests and residing in various parts of the country.

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CORAL REEFS AND CORAL ISLANDS

(Continued from page 187)

do reef corals find temperatures to their liking. In the vast layers of rocks that compose the mass of continents there are thousands of petrified reefs. The vicissitudes of time have destroyed most of the delicate structure of individual corals, but here and there obvious fragments may be found and the form of the reefs has been well preserved. Many of these ancient reefs are strikingly similar in shape to the atolls and fringing reefs of the South Pacific. If it can be assumed that ancient reefs required the same tropical environment as their modern counterparts, then their geographical distribution provides data regarding distribution of ancient tropical waters.

One of the features of modern coral islands is their porosity. When, by combination of circumstances, a reef becomes extinct and is buried beneath hundreds of feet of sediments, it is compacted to hard limestone, which, in contrast to the surrounding sediments, is still quite porous. Under complicated conditions this buried limestone mass may become the reservoir of vast amounts of petroleum.

In southeast New Mexico and adjacent parts of Texas there is an enormous horseshoe-shaped fossil reef, opening to the south. The west portion is exposed on the surface in El Capitan, the highest peak in Texas, and here the typical form of a coral reef is apparent. Northward, along the west side of the horseshoe curve, the reef gradually dips below the surface until the east half of the curve is from a few hundred to a few thousand feet underground. This subsurface part is a gigantic reservoir of petroleum, and from an exceptional well as much as a million barrels of oil have been recovered. Ancient reefs, as well as their modern South Pacific relatives, thus have a vital and strategic role in World War II.

LABRADOR TEA

(Continued from page 208)

to the Great Spirit, but there was no sign that their words were heard. Then Wan-da-sega, the medicine man, decided that things were so bad that he must burn the sacred powder, the greatest medicine of all. So he built a sacred hut away from the village and burned the sacred fire for a long time. When he returned to the village all the people gathered and asked, 'Did the Great Spirit speak?' And Wan-da-sega looked troubled but he answered, 'Yes, the Great Spirit spoke. He is angry because many of our people have broken his laws. I do not like to say what must be done to please him.' But all the people begged him to speak, so he said, 'The Great Spirit asks that one of our young warriors, pure in heart, must bid goodbye to his family and friends and walk in the big swamp for many suns.' All the people looked at each other, for who among them was pure in heart? Then the Chief's son, Muck-i-go-ba, said, 'I will do his bidding.'

"So Muck-i-go-ba said goodbye to his father and friends, and went into the swamp. After many suns Wan-da-sega followed, and there, wherever Muck-i-go-ba had walked he found a strange bush with evergreen leaves. Of Muck-i-go-ba, he found not a sign. Wan-da-sega brought back the leaves and brewed them into a warm and fragrant tea for all the tribe. It healed their stomachs and their aching bones, and they thanked the Great Spirit for his gift. Soon the sun turned his face towards them again, and the snows melted. But ever since, this plant has been called Muck-i-go-ba, and the Chippewa people gather its leaves and store them away to use during the moons of snow and cold."

THE SCHOOL PAGE

(Continued from page 216)

not believe us, we challenge them: Try it. Pile out of bed some morning when it is still dark. Steal out of the house as the first gray dawn unfolds in the East. Go out into some open field or woodland or ravine. Go quietly and use your eyes and ears. It may have rained during the night; then the trees will drip softly and the grass will swish against your boots. Watch where the mists lift and settle and finally lift again. Suddenly, you will hear quick rustlings in the underbrush, the whir of wings, the first eager notes that mark the overture of feathered songsters. Then you will know what we mean. You will find, as we did, a gateway to another world, a world of melody and beauty and enchantment.

Yet, we know that some of you may say—"Have we the right to take the time, now, to scramble about the hills and valleys in the days which lie ahead?—We are a nation at war."

Our answer is, yes. True we are a nation at war and our greatest and most urgent need is to end that war as victors. But some day we will again be a nation at peace, and something of that peace we must cherish even now, that inner peace that comes from the intimacy and friendship with the common things about us. To us there is no greater fulfillment than the rights of individuals to spend their time afield, with hills and rivers and trees and birds, in freedom. Of what worth is a crescent moon or waves on a sandy beach? Can you reduce to dollars and cents the blueness of the sky? Or the first green of grass in the spring? Is there anything you can do with falling apple blossoms or the roll of thunder? Do these things have value? The answer to that is obvious. Some of them have value to every one of us; and the values that they have, the values that there are for woodland flowers and quiet brooks, for twilights and pine trees sighing in the wind—these values, too, we can find in birds.

WITHIN THE ZODIAC

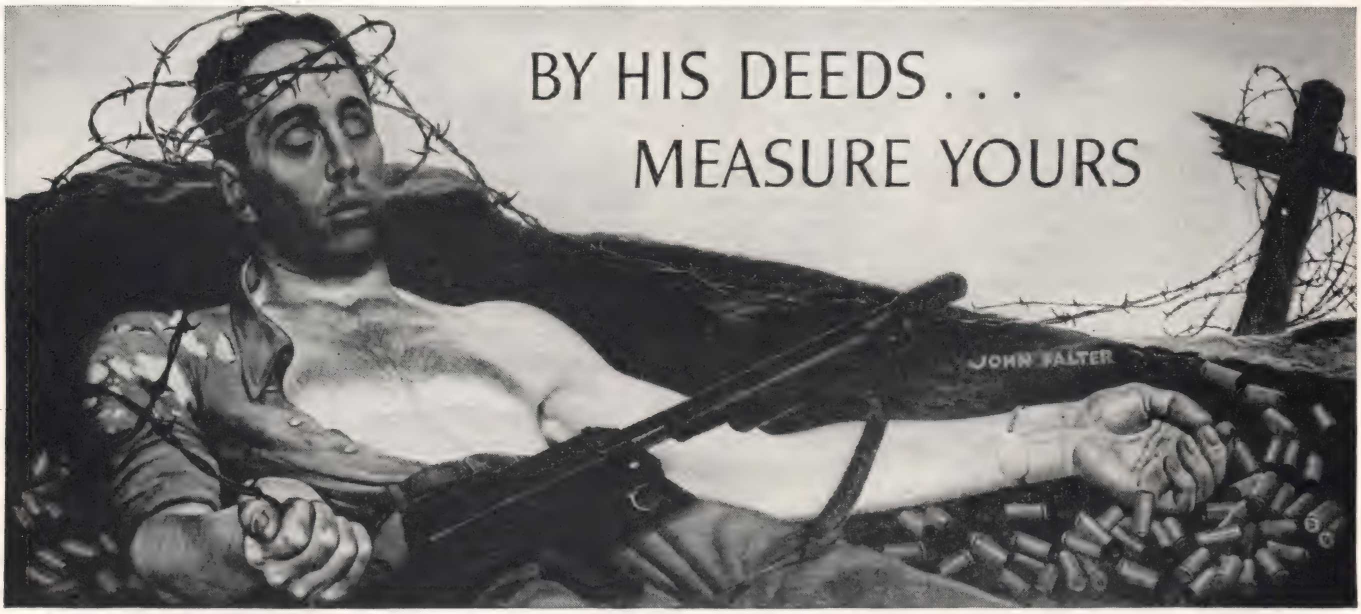
(Continued from page 214)

Milky Way. It is not difficult to observe it within the tropics because there the ecliptic always rises at a sharp angle from the horizon and the skies are often very clear.

One should look for it along the ecliptic in the spring, as twilight fades, from the horizon in the direction of Gemini. The cause of the zodiacal light still remains something of a mystery. It is generally explained as the result of sunlight reflected from myriads of dust-like particles that lie in the plane of the earth's orbit, while the counterglow is caused by a concentration of these particles in a sort of dynamic whirlpool opposite the sun and a million miles or so beyond the earth's orbit. Some believe that these particles instead of revolving directly around the sun are in form of a faint ring around our own planet, or are expelled from our own upper atmosphere on the sunrise and sunset side by the sun.

Mercury may be seen to excellent advantage this month near the time of its greatest eastern elongation, which occurs on April 30. It will then set nearly two hours after the sun and one should have no difficulty in finding it close to the Pleiades. Venus is now very brilliant in the evening sky. It will lie between the Pleiades and Hyades about April 20.

IT is not pleasant to have your peaceful life upset by wartime needs and restrictions and activities.... It is not pleasant to die, either.... Between you who live at home and the men who die at the front there is a direct connection.... By your actions, definitely, a certain number of these men will die or they will come through alive. If you do everything you can to hasten victory and do every bit of it as fast as you can... then, sure as fate you will save the lives of some men who will otherwise die because you let the war last too long.... Think it over. Till the war is won you cannot, in fairness to them, complain or waste or shirk. Instead, you will apply every last ounce of your effort to getting this thing done.... In the name of God and your fellow man, that is your job.



The civilian war organization needs your help. The Government has formed Citizens Service Corps as part of local Defense Councils. If such a group is at work in your community, cooperate with it to the limit of your ability. If none exists, help to organize one. A free booklet telling you what to do and how to do it will be sent to you at no charge if you will write to this magazine. This is your war. Help win it. Choose what you will do—now!

EVERY CIVILIAN A FIGHTER

CONTRIBUTED BY THE MAGAZINE PUBLISHERS OF AMERICA

Under the Microscope

By JULIAN D. CORRINGTON

THE POISON PEOPLE

ACCORDING to Kipling's *Mowgli* the jungle folk would hold no traffic with the cobra clan, whom they dubbed the Poison People—despised and feared alike by man and beast. But while serpents have ever typified all that is malignant in the animal kingdom, they are by no means the only, although indeed the most obvious, of poison-bearers.

"Let it alone! It's poisonous!" That admonition rings in our minds' ears from childhood and prevents many a grown-up from discovering the ingenious adaptations for chemical warfare shown by a host of plants and animals,—organisms surrounded by an aura of superstitious lore and endowed with an atmosphere of mystery. What is not understood is "mysterious!"

We can see the point of speed, or cunning, of tooth or claw, as means of accomplishing the universal desire—to eat but not to be eaten. Once we grasp the notion that the use of poison is only another of the many ways to this same end, and study the details of these marvelous organs of offense and defense, the "mystery" is dispelled and its place is taken by admiration for these clever devices, some of them readily visible, others requiring the use of a microscope.

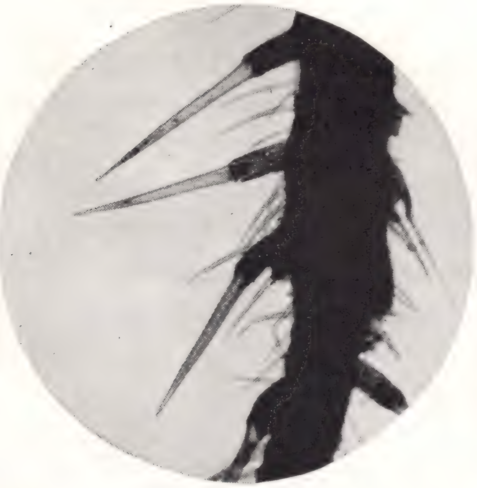
Some organisms are not adaptively poisonous; they do not secrete a deadly fluid in their struggle to survive, but happen to contain certain chemical combinations in their makeup—largely alkaloids—that are injurious or even lethal when taken into the bodies of other organisms as food. Such are the terrible death angel, *Amanita phalloides,* and fly agaric, *A. muscaria,* arch slayers of the mushroom world that annually claim many victims among persons ignorant of the fungi and their ways; the dreaded water hemlock, *Oenanthe crocata,* chosen vehicle of Socrates when condemned; the leaf of the rhubarb, with edible leafstalks; and numerous tropical fishes whose flesh is dangerous or deadly.

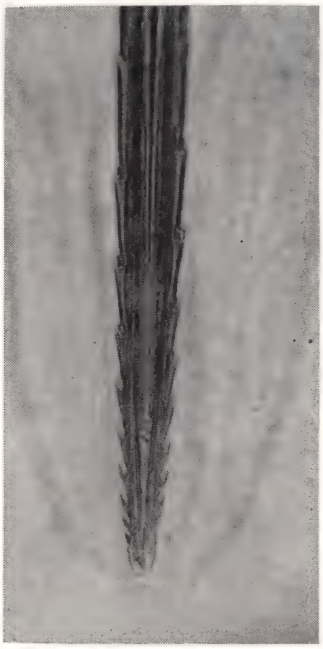
Next come instances of poison secretion as a means of protection, as with salamanders and frogs and poison ivy, an adaptation to diminish the chances of being eaten. This does not always work, as we know to how great an extent frogs serve as food for a whole host of enemies. Yet some species are much better provided in this respect than others. Perhaps you have seen, as we have, a garter snake, evidently too young and inexperienced in the snares of this world to know better, attempt to seize and swallow the little red newt of the woodlands, land stage of the common pond newt. Like all amphibians, the skin of this creature is equipped with large poison glands which secrete an acrid and bitter-tasting fluid, and the would-be captor will release him immediately and wipe the sides of the jaws upon the soil or grass, quite evidently undergoing the same sensations as a person who has inadvertently tasted something very bitter, like quinine.

Millipedes, commonly dubbed "thousand-legged worms," secrete something far more effective—cyanide! No wonder the fate that befell all those little brown snakes we once collected on a rocky hillside and, in our ignorance at the time, placed in a glass jar along with a number of the large purplish-red millipedes, *Julus.* Within a few minutes, all of the snakes were dead, their bodies rigidly contorted. Although *Julus* owns neither biting jaws nor a sting, he is none the less a dangerous customer for small forms of life; the original inventor of poison gas warfare.

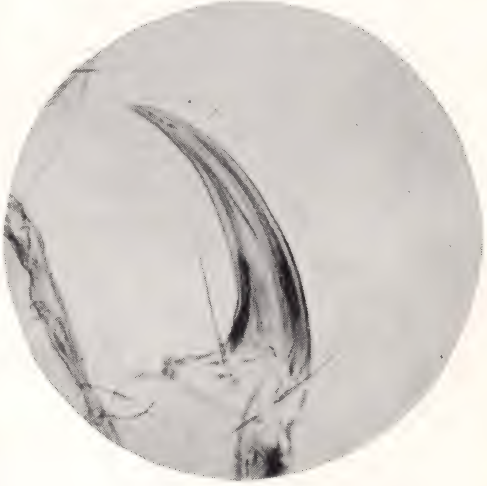
None of the foregoing have any means of injecting their poison into the bodies of victims, and are correctly termed *poisonous.* Quite different are those provided with jaws or spines for introducing the deadly secretion beneath the skin or into the blood of their enemy or prey. These are *venomous* organisms, and their secretion is correctly spoken of as a venom, with two main types of inoculation, by biting with jaws or by stinging with spines or stings. Venoms and poisons are of chief interest to the chemist and toxicologist; the venomous apparatus concerns the biologist

Below are the stinging hairs of a nettle leaf, and, right, the barbed darts of a bee's sting.





Below is the single venomous claw of centipede. Photomicros by J. F. Brandt. Slides from Ward's Estab.



and student of Nature's interactions.

Among venomous plants may be mentioned the nettle, whose leaves are efficiently armored with stiff spines that can introduce a venom with which most of us have had experience. Of a similar nature are the spines on the back and side fins of the catfish, designed to lacerate the flesh of the incautious captor and inject a venom secreted in a gland at the base. Many disciples of Izaak Walton know how troublesome is this type of wound. Swimmers sometimes run afoul of the sea nettle, or other of the larger jellyfishes, and have cause to remember their study of the little freshwater polyp, *Hydra*, in the elementary biology course, and his nematocysts or stinging cells. This complex structure has a trigger set off by contact, causing the cell to explode and shoot out a long hollow thread, through which the venom makes its way into the punctured skin of the trespasser. Batteries of thousands of these nematocysts on the tentacles of jellyfish serve effectively in killing small creatures used as prey or in warding off larger animals that might be enemies.

The nettle spine and the nematocyst make most interesting microscope slide mounts, either in the fresh or preserved condition. Handling a nettle leaf with forceps, snip off a small bit with scissors and mount in two drops of water under a cover glass, or process by the usual technique of passing through a graded series of alcohols, into xylene, and mounting in balsam. Nematocysts are best studied in a living *Hydra*, held under a cover glass in a little water. Tapping on the cover gently with a dissecting needle or point of a pencil will cause the discharge of numerous nematocysts, which should be studied under high power. A permanent balsam mount of an entire *Hydra* will also disclose these nettling cells.

Larger and more familiar to everyone are the stings of bees and wasps, subject of countless jests, yet no joke to the unfortunate animal or person who blunders into a hornet's nest! The sudden, stabbing, fiery pain and subsequent swelling and inflammation all attest the effectiveness of the sting and virulence of the venom which, indeed, will quickly kill small animals. The organs concerned in producing these effects are highly interesting and easy to observe.

A freshly-killed bee is placed in a small vessel of water for overnight, then the sting is gently grasped and pulled with forceps held in the right hand, while the left presses upon the specimen's abdomen. This usually results in forcing out the entire stinging apparatus intact, which may be mounted in water for temporary examination, or processed for a permanent balsam mount, stained with eosin. The sting itself consists of a pair of barbed darts sliding in a sheath. These are connected by the venom duct with a venom gland, a long forked tubular affair, which is provided with a reservoir near its outlet. A pair of finger-like sting feelers seek out a suitable location for administering this unwelcome attention, and aid in guiding the darts.

A quite different sort of sting is that of the highly-feared scorpion, a relative of the spider. Here the last segment of the long and slender abdomen ends in a sharply pointed and curved spine, with a tiny opening for exit of venom, secreted in its swollen basal half. Some species of scorpions, notably the smaller ones, are almost as deadly as venomous snakes and have an unsavory record of human deaths attributed to them.

By contrast are the venomous biters of the arthropod clan—the spiders and centipedes. Here the organs inflicting the injury are modified jaws, which in turn are modified legs, termed *chelicerae.* Ducts connect these piercing structures with venom glands, the chemical itself being virulent and speedily fatal to the small creatures that form the natural prey of these carnivorous and aggressive animals. The larger tropical centipedes and certain spiders, notably the black widow, which has received so much publicity of late, are formidable to man; others are negligible. Micro mounts of these weapons are easily prepared, though a bit of skill and practice is needed to dissect them out.

Among vertebrates, there are two types of venomous fishes; those with venomous stinging spines, as the catfish already mentioned; and those with fangs, as the morays, with much the same sort of apparatus as a cobra, having modified teeth to inflict a lacerating bite and inject venom. While practically all amphibia are poisonous to captors attempting to eat them, none are venomous, nor are there any illustrations of this habit among birds. Reptiles include the most spectacular of venomous animals, with two species of Gila monster lizards and a great many types of snakes. Gila monsters, the only venomous lizards in the world, have ducts from specialized glands of the lower jaw that open at the base of lower teeth, but have never developed any

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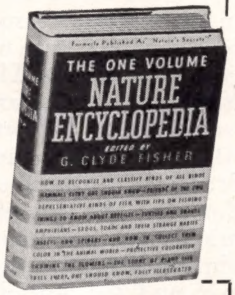

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mechanism to forcibly expel the dangerous secretion. Hence their habit is to lie on their backs after grasping a victim, allowing the saliva to flow downward by gravity. They are formidable but seldom fatal to mankind.

Three groups of venomous snakes are known, greatly outnumbered by the harmless varieties, yet sufficiently numerous in certain districts as to constitute a serious menace. These groups might be termed the back-fangs, front-fangs and hinged-fangs, to indicate differences in location and arrangement of the inoculating apparatus. The back-fanged snakes are little known to the average person, being residents of the more remote tropical regions and not especially dangerous to animals as large as man. The front-fangs, however, include the cobras, coral snakes and true sea snakes, with grooved, short and fixed teeth in the front of the mouth, and salivary glands in the upper jaw that secrete a most potent venom. Those of India account for upwards of 25,000 human deaths annually, but fortunately for our own country, our coral snakes are seldom seen, being burrowing and inoffensive.

Rattlers, water moccasins and copperheads constitute our assemblage of hinged-fanged vipers, having a pair of enormously developed hollow teeth in the front of the mouth, attached to a bone in such a manner as to rock forward and point with the tips straight to the front when striking. Such a snake literally stabs the victim, the venom meanwhile being squeezed out of its glands by muscles, flowing forward through a duct and down the fangs to a small opening near their tips —a bulb syringe connected to a hypodermic needle.

All of these features are best seen by means of dissection, as would be the case also with the only known species of venomous mammal. Curiously enough, the lowest mammal in the scale, and the one most closely allied to reptiles, has a venomous spur on the heel of each hind leg; a structure something like a rooster's spur, but hollow and connected with a venom gland. This creature is the egg-laying duckbill or platypus of Australia and Tasmania, whose sting is said to be comparable to that received from the fin spines of a catfish.

Thus the Poison People, an interesting crew once their ways are known. Theirs is the sudden rush and the quick, lethal bite or sting, far more efficient, conservative and even humane than the rending and tearing of the tiger or shark—one of Nature's highest specializations in the universal art of killing.

PRIZE WORD ACROSTIC

Quite a bit of interest was aroused by our acrostic in the February issue. It was a tough one to solve correctly and we were not surprised at receiving only two perfect solutions. The prize—a year's subscription to *Nature Magazine* and membership in the A.S.A.M., was won by Robert L. Kendig, Alden Road, Bryn Athyn, Pa., and the runner-up was D. G. MacBain, Scarboro Collegiate Institute, West Hill, Ontario, Canada. The ten words, all of which apply to the microscope, are: magnification, image, correction, resolution, objective, stage, condenser, ocular, projection, eye, and the initials of these ten spell microscope. Stage, ocular, and projection proved to be the hardest words to solve.

APPLE POLISHER

Teachers will at once recognize, from the title, inauguration of a series of brief sketches for their particular benefit. Most of the items to appear will be familiar to many, but we hope that there will be a sufficiently large number of readers each month who will find the methods and gadgets novel and thus make this subdepartment pay for its ink and room in reader interest.

This month we are describing a simple device to train the beginner in microscopy to appreciate depth of focus. Materials needed are slides and covers, medicine dropper pipettes, fine forceps, and three spools of silk or cotton thread, preferably of three strongly contrasting colors, as red, blue and green (or yellow). One foot of thread will outfit many slides, so it may be more thrifty to pilfer from the home workbasket than to buy whole spools just for this one exercise.

The teacher can make the first slide, as a demonstration, then have each student make his own. Cut short lengths (approximately one-quarter inch each) of the three colors of threads, and with the forceps lay these on a blank slide, one on top of the other, in separate axes, but all crossing at the center. Add a drop of water and a cover glass, then examine under low power, focusing up and down to observe the different elevations and superpositions of the threads where they cross. Permanent balsam mounts are simplicity itself to make, but there is higher teaching value in having each student make his own temporary slide, then examine it himself. If he wants to make such a slide to keep for his personal collection, add xylene rather than water, three minutes, then balsam and a cover glass.

BOOK REVIEW

In these reviews we have cited many works on optical instruments but, until now, none on the most wonderful of them all, the human eye. Inasmuch as the eye is an integral part of every observation made through the microscope, and as microscopes are designed primarily for visual use, such a work as Professor James P. C. Southall's *Introduction to Physiological Optics* should find a place on the book shelves of all advanced or serious microscopists.

The chapters include a study of the eye and of vision in all aspects; normal and abnormal, monocular and binocular, rod, cone, and color vision; relations to time and space, movements of the eyeball, and the many forms of spectacles. Frequently the sections include considerable mathematics and require a foundation in modern physics, but there are large portions readily understandable by the reader who lacks such background, and if one's training compels skipping of the mathematical material, there is still much to be gained from this volume.

The author writes in a most attractive style and includes historical sketches, humorous accounts, familiar comparisons, and interesting experiments. In short, he takes a subject that could be as dry as dust and exceedingly difficult, and makes it compelling, illuminating, animated. All those whose profession has to do with physics, the eye, vision, photography, the stage or motion pictures, illumination, and color matching will find this book indispensable, while others will find it at the least highly informational and interesting. Pp. x, 426; figs. 135, 3 in color. Oxford Univ. Press, 114 Fifth Ave., New York, 1937. $5.50.

This department is at the service of all those interested in microscopy. If any knotty problems confront you and seem to defy solution send them to this department, Nature Magazine, 1214 Sixteenth Street, N.W., Washington, D. C. Inquiries and requests for advice will be answered by mail just as soon as the pressure of time these days permits.

(Continued from other side) . . .

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She might have been weaned on pickles, for all the sweetness she showed him. For *he* was a Patriot . . . and she loathed them all with a violent hate. How could love grow in *such* a soil? But it did—with a passion that was just as violent!

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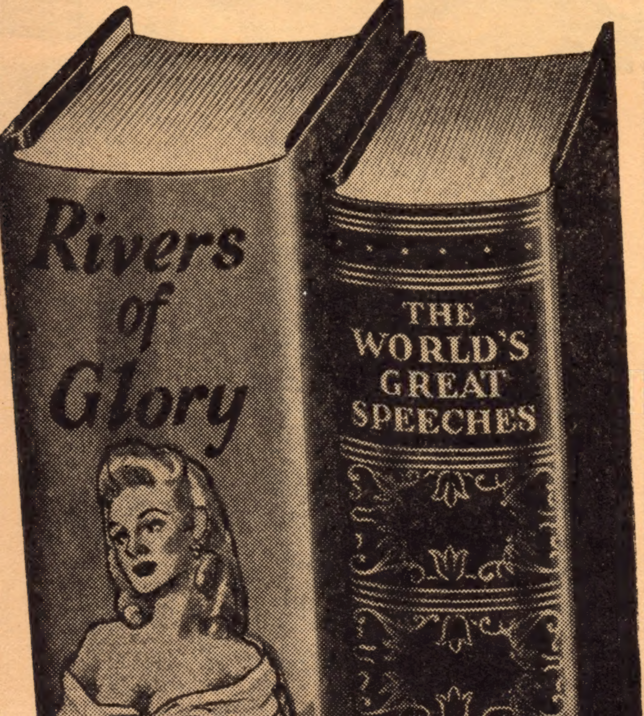

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